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THE IMPROVED CÆSAREAN SECTION, WITH THE REPORT OF A SUCCESSFUL CASE.

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In two previous papers[1] I have called the attention of the profession to the improvements gradually introduced in the performance of the Cæsarean section. In the first, I reported an operation I had performed on a patient afflicted with numerous chronic and acute diseases, and weakened by an ante-partum hemorrhage, in consequence of which the fœtus died long before the operation was performed. The mother died fifty-two hours after the operation, and the autopsy showed that the peritoneum, which had been folded in over the edge of the incision in the uterus, as well as the outer two-thirds of the muscular wall, was agglutinated by the first intention, and that the line of union on the peritoneal covering was, to a great extent, covered with a fine white film of new-formed tissue or "plastic lymph."

In the second paper, I showed how little ground there is for attaching a single man's name to the operation in its present shape, which is a beautiful outgrowth of general surgical and special gynecological development, an evolution due to the combined efforts of many men working independently of each other, in different countries, especially Lister in Scotland, Spencer Wells in England, Guéniot in France, P. Müller in Switzerland, Leopold in Germany, and last, but not least, Lungren in the United States.[2]

[1] American Journal of Obstetrics, April, May, June, 1883, and October, 1886.

[2] Even in Germany voices have been raised against the ludicrous claim alluded to. At the meeting of the German Gynecological Society in Munich, in 1886, Kaltenbach asked what was left of Sänger's method after the undermining of the peritoneum and the excision of the muscular tissue had been given

This time I have the pleasure to report a case in which I successfully applied most of the improvements discussed critically in the former papers.

CASE.—Minnie St. J., American, twenty-two years old, married, domestic, was admitted to the Maternity Hospital, Blackwell's Island, January 31, 1888. She is the youngest of several children. Her parents died when she was two years old, but she says they were both small of stature. She does not know anything about her mother's confinements, nor about the size of her sisters and brothers. In her childhood she had measles, whooping-cough, and croup, enlarged and suppurating glands on the neck, of which there still remain large scars, and fainting spells during a whole year, when about six years old. After that she enjoyed good health. She menstruated for the first time at fifteen. Her menstruation was regular, and at first painless, later she suffered somewhat from dysmenorrhœa. Two years ago she had a spontaneous miscarriage when she was two months advanced in pregnancy. Her last menstruation occurred on May 20, 1887; quickening at five months. During the first four months of her pregnancy she had morning vomitings, later she was well.

The patient is 55½ inches (141 cm.) high, of slender build, blonde, and pale. The pelvis measured, between the anterior superior spines of the ilium, 7½ inches (19 cm.); greatest distance between the two cristæ ilium, 8½ inches (21.5 cm.); Baudelocque's diameter, 6¼ inches (16 cm.); between the posterior superior spines of the ilium, 2½ inches (6 cm.); between the trochanters, 10 inches (25 cm.). Vaginal examination revealed great narrowness of the transverse diameter of the whole pelvis, a narrow pubic arch, and a true conjugate little more than 3 inches (8 cm.).

My colleagues, Drs. R. A. Murray and E. H. Grandin, expressed the opinion that the choice would lie between laparo-elytrotomy and Cæsarean section. Some years ago I took great interest in the former operation, and investigated its history, its anatomical basis, and best mode of execution,[1] but that was at a time when the Cæsarean section either in its old form, or as Porro-Müller's operation, presented a mortality of fifty-four to fifty-eight per cent. In view of the great success obtained of late by the improved Cæsarean section, that, in my opinion, must at present take the lead in the list of operations applicable in a case as the one before us.

up, and silk and silver had proved to be about of the same value. All that Sänger, who was present, had to answer, was that he had recommended the use of numerous sutures, that he had rejected absorbable material for suturing, that the decidua should not be comprised in the suture, and that he laid special stress on an exact sero-serous suture. But every single one of these points has been borrowed from others; numerous sutures and the combination of deep muscular and superficial peritoneal sutures were used in fibroids of the uterus by Spencer Wells and by Kehrer in Cæsarean section; catgut had been rejected. Lungren had avoided the decidua as early as 1875, and published it in 1880. (Archiv für Gynäkologie, vol. xxviii. p. 463.)

[1] Garrigues on Gastro-elytrotomy, New York Medical Journal, October and November, 1878, reprinted as separate pamphlet by D. Appleton & Co. Additional Remarks on Gastro-elytrotomy, with Special Reference to Porro's Operation, American Journal of Obstetrics, January, 1883.

Labor pains began on February 23d, at 8 P. M. I reached the Island, upon which the hospital is situated, at midnight. It took two hours to make the necessary preparations, as the only thing that had been done beforehand was to disinfect the room with bichloride and sulphur.[1] When everything was ready for the operation I examined the patient, but finding the os only sufficiently dilated to admit the tip of the finger, and labor pains weak, I thought it was better to wait. During the night, the pains increased, and the outer os became sufficiently dilated to allow easy simultaneous introduction of the finger and a uterine tube.

Etherization was begun on February 24th at 7.55 A. M. The abdomen and genitals were shaved, washed, and disinfected with bichloride of mercury (1 : 2000). I was assisted by Drs. E. H. Grandin, H. C. Coe, H. Jarecky, K. Ruffin, and A. D. Rockwell. Dr. R. A. Murray, who lives at a great distance from the hospital, and could not be sent for before six o'clock, arrived during the operation. The house staff of Charity Hospital, and many of the members of the Training School for Nurses were likewise present.

The sponges were kept in a weak solution of corrosive sublimate (1 : 5000), the instruments in carbolized water (two and a half per cent.). All participating in the operation disinfected themselves with bichloride (1 : 2000).

The patient's condition was good, pulse and temperature normal. The fundus stood seven inches above the umbilicus. The fœtus was in vertex presentation, left occipito-anterior position. The head was entirely above the brim of the pelvis. The fœtal heart was heard three finger breadths to the left and below the umbilicus. It beat 120 per minute, was regular and of normal strength.

At 8.17 A. M. I made an incision in the median line, from the umbilicus to two and a half inches above the symphysis pubis. A few vessels were clamped with compression forceps. The peritoneum was opened enough to introduce the tip of the index finger and then slit open with scissors to the same extent as the other parts of the abdominal wall. Next the incision through the abdominal wall was extended four inches upward to the left of the umbilicus, just enough to lift the uterus out. Before doing so I inserted four silk sutures through the edges of the wound above the umbilicus, and clamped them at sufficient length to allow the uterus to pass. The incision was extended a little downward so as just to have room for the uterus, when it was tilted out. Next I introduced the left hand into the abdominal cavity and pulled out the uterus, first the right corner, then the fundus, and finally the left corner, when the body followed easily. The uterus was immediately enveloped in hot towels wrung out in bichloride (1 : 10,000). Next I placed a finger-thick rubber tube loosely around the cervix, just below the head. Then I tied the four sutures at the upper end of the abdominal incision. They had become entangled in the omentum, but were easily liberated and closed. Flat sponges were placed behind and in front of the uterus.

The uterus was opened in the median line, beginning at the most prominent point, with small, repeated cuts. The wall was nearly an inch thick. As soon as the index finger could be introduced I dilated the incision upward and downward with a probe-pointed bistoury, just

[1] Garrigues: Practical Guide in Antiseptic Midwifery in Hospital and Private Practice. Detroit, 1886. Pp. 23 and 24.

enough that my hand could pass, about to the length of five inches (13 cm.). At the same moment the incision was begun, the tube around the cervix was tightened. Very little blood flowed out from the cut surfaces and was easily wiped off with sponges. The edges separated and the intact ovum appeared at the bottom as a greenish-gray vesicle, in the interior of which the fœtus was discernible. I tore the membranes near the lower end of the incision, introduced the left hand, grasped the occiput of the child and lifted the head out. The body followed. I tied and cut the cord, and left the child to the care of Dr. Manges and Miss Marion Murphy, the head nurse. The child was removed at 8.35, eighteen minutes after the beginning of the operation, but only a minute after the tightening of the constrictor. It gasped and grunted already on the table and soon cried lustily.

The placenta had been inserted on the posterior wall, but had been cast off. I grasped it and peeled the membranes off from the uterus in one piece, together with the placenta. At the lower end the membranes were caught in the constricting tube, but I could introduce one finger and liberate them. The removal of the after-birth was finished at 8.37.

I passed six deep silk sutures through the wall of the uterus, except the endometrium, entering about three-eighths of an inch from the edge on the outer surface. The ends of each of them were provisionally clamped. The uterine cavity was not sponged, washed, or dusted. In closing the deep sutures the peritoneum was folded in between the edges by means of a tenaculum. Next, eight superficial fine silk sutures were inserted through the peritoneum alone, between and at the ends of the deep sutures, going in and out on the same side before crossing the line of incision, so as to obtain a broad apposition. While they were being tied the assistant took off the strain by means of two tenacula. At the lower end it was found that a small piece of peritoneum had been torn off on the right side, in some unaccountable way. The edge being too far away from the line of incision to be united with the edge of the peritoneum of the opposite side, I passed the suture through the sub-peritoneal connective tissue on this side and connected it with the peritoneum on the other side of the incision.

When the last suture had been passed, the tube was loosened slowly without removing it. When the blood-current returned to the uterus, some hemorrhage appeared between the fifth and sixth deep suture, near the lower end of the incision, which had gone a little beyond the line of demarcation between the thick and the thin part of the uterine wall. Very large veins were observed below the peritoneum in this place. Two additional sutures were passed under them, when the hemorrhage stopped. At the other sutures there was slight oozing, which was checked by mere compression with sponges. Twenty minutes were occupied in watching and controlling this hemorrhage. A couple of sponges, introduced on sponge-holders to the bottom of the pelvis, came out entirely clean, showing that neither blood nor liquor amnii had entered the peritoneal cavity. The tube was removed, and the uterus replaced. The omentum was left at its top. The abdominal wall was closed with eleven deep silk sutures comprising the whole wall, special care being taken to include the aponeurosis of the abdominal muscles. Five superficial silk sutures were inserted where they were needed to accomplish perfect apposition of the edges of the skin. The abdominal sutures were passed from 9.18 to 9.35.

When I was through closing the abdominal cavity, it was noticed that the uterus had enlarged somewhat, and when I squeezed it, some clots and fluid blood came out from the vagina. I, therefore, at 9.40, gave a hot intrauterine douche of six pints of a solution of bichloride (1 : 4000). The external os admitted the tube and one finger easily, but I had some little trouble in passing the glass tube[1] through the internal os. Several small clots were washed out with the intrauterine douche, and all hemorrhage stopped.

The wound was dusted with iodoform, covered with a piece of gutta-percha tissue, half a dozen layers of iodoform gauze, a thick pad of salicylated cotton (five per cent.), five broad strips of rubber adhesive plaster, muslin belly binder, and my usual antiseptic perineal occlusion dressing.[2] Two grains of ergotin were injected hypodermatically on the back of the right forearm.

Duration of operation, from beginning of incision until the last suture was tied, one hour and eighteen minutes.

The child, a boy, weighed six pounds nine ounces; the diameters of his head measured, occipito-mental, five and one-quarter inches (13.5 cm.); occipito-frontal, four and three-quarters inches (12 cm.); fronto-mental, three inches (7.5 cm.); suboccipito-bregmatic, three and three-quarters inches (9.5 cm.); biparietal, three and three-quarters inches; bitemporal, three and one-half inches (9 cm.); bimalar, three inches (7.5 cm.). At the hour of proof-reading, five weeks after the operation, he is in excellent condition. The after-birth weighed fifteen ounces. The cord was twenty inches long.

The patient was placed in a bed with bottles filled with hot water She rallied well from the anæsthesia, but complained of nausea, which was much relieved by repeated doses of ʒss to ʒj of strong black coffee. Later, she was given milk, brandy, and water. The perineal dressing was, as usual, changed every six hours. The urine was drawn with catheter until she could pass it herself. The lochial discharge was bright red, without fetor, normal in quantity. The pulse was more frequent than usual, temperature and respiration normal. Off and on, during the first few days, she complained of pain in the abdomen, which was easily relieved by one-eighth of a grain of morphine. From the third day, when she felt a desire to have her bowels move, they were kept open by a daily enema of soapsuds. Three times a day she was given ʒss of fluid extract of ergot, but, as it caused vomiting, we left it out after the second day.

On account of the ether she was not allowed to nurse the baby for twenty-four hours, but after that she did so regularly, the child received no other nourishment for three weeks and throve.

The mother lived on coffee and milk for four days. Then wine jelly, farina gruel, beef-tea, and eggs were added. From the ninth day she ate beefsteak, turkey, potatoes, and cake.

On March 2d, a week after the operation, the abdominal dressing was changed for the first time. All sutures were removed. The wound was found healed by the first intention, the upper two inches and one inch at the lower end through the whole thickness of the wall. On a space of two and one-half inches, just below the umbilicus, the deeper parts were united, but not the skin. There was no trace of pus anywhere. The

[1] Antiseptic Midwifery, p. 94.

[2] Ibid., p. 27.

fundus uteri was felt just below the umbilicus. There was no tenderness on pressure. The abdomen was cleansed with bichloride (1:2000), the wound dusted with iodoform, the tension taken off by means of rubber adhesive plaster strips, one finger-breadth wide and nine inches long, and a similar dressing put on as the first time.

On March 8th the temperature, which had been normal all the time, rose to 103¾° F. The patient complained of pain in the right breast, where there was found a hard and tender nodule in the mammary gland and an excoriated nipple. On March 1st, the nipple had become sore, and had been treated with tannin, but this time we did not succeed in avoiding mastitis.

The abdominal dressing was removed. The wound was healed throughout by the first intention. The fundus stood yet four inches above the symphysis pubis, but there was no trace of tenderness either on abdominal palpation or by vaginal examination, and the lochial discharge consisted of normal, thick, sweet, slightly pink, odorless mucus.

The uterus was found fastened to the abdominal wall to the right of the line of incision. The fundus stood four inches above the right pubic bone. Only four narrow plaster strips were put over the abdomen, and the dressing renewed.

The following table shows the state of the temperature, pulse, and respiration during the first two weeks before the breast became inflamed.

Date	Temperature.		Pulse.		Respiration.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P M.
February 24	.....	100 4°	.....	106	.....	24
" 25	99.3°	99.3	100	106	20	20
" 26	99.6	99.8	90	94	20	20
" 27	99 1	99.2	86	76	19	18
" 28	98.5	99.5	70	86	20	22
" 29	99 3	98.4	88	70	21	20
March 1	98.1	98.8	76	67	20	20
" 2	98 7	98.0	84	60	20	16
" 3	98.9	98 4	66	64	20	18
" 4	98.3	99 1	66	66	20	22
" 5	98.5	99.0	62	62	22	18
" 6	98.3	98.8	60	64	18	18
" 7	98.6	99.5	56	54	19	18
" 8	98.5	.....	60	.....	22	.....

Apart from the breast trouble, she continued in excellent health, got out of bed March 16th, and is well now, five weeks after the operation. The fundus stands as mentioned, the os is drawn upward and forward, and is felt a little above the symphysis pubis, near the anterior wall of the abdomen, three and three-quarters inches below the fundus.

Anatomical and physiological observations.—A short description of the organs as they appeared during the operation may, perhaps, interest some of my readers besides myself.

Before being incised the uterus was of a purple color, and the tightly stretched peritoneal covering reverberated the light like a polished surface. The fundus was so much developed that it formed half a circle; the tubes and ovaries lay way up in the abdominal cavity. During the incision the edges retracted, and when it was finished the uterus presented a large gaping opening with bevelled edges, the outer parts being more retracted than the inner. At the bottom of this gap lay the ovum as a transparent greenish-gray bag, in which the fœtus could be seen indistinctly. When the membranes were ruptured the body of the womb contracted so as to fit its contents tightly. After the removal of the fœtus it contracted again—so much as to measure only six or seven inches from the cervix to the fundus. The cut edge was about one and one-half inches (4 cm.) thick. The peritoneum was shrivelled up and lay in wrinkles like a misfit coat, and had a light gray color, and dull, waxy appearance, having lost all its former shining gloss. It was easily lifted up and folded in a quarter or three-eighths of an inch. The cut surface had a grayish-brown color as of half-boiled meat, and on it appeared the contracted sinuses as round, cherry-colored spots one-eighth of an inch in diameter. Douglas's pouch was remarkably shallow. In front of the uterus was yet left a good-sized pouch, but that was because I had not extended the incision down to the symphysis of the pubic bones.

The placenta was inserted on the posterior wall of the uterus. It was loose, a normal consequence of the contraction of the surface to which it is attached. The membranes behave in an entirely different way. In the three Cæsarean sections I have seen and, so far as I remember, in all I have read of, they remained fastened to the inside of the uterus and had to be carefully peeled off by inserting the fingers between them and the uterus. On account of their thinness and great elasticity they adapt themselves to the size of the surface on which they have grown, which the placenta under normal circumstances cannot do. The difference between the peritoneum, that lay in wrinkles, and the membranes, that adapted themselves to the inside of the uterus, was very striking. The separation between the ovum and the uterus took place in a white spongy substance that broke easily under the advancing fingers. The fact that the membranes adhere to the inside of the womb after the placenta is cast loose is of special importance for those who use Credé's expression method or any other method by which the placenta is delivered artificially soon after the birth of the child. It teaches the necessity of withdrawing the membranes very slowly and carefully in order not to tear them.

After the removal of the placenta and the membranes the uterine wall was entirely smooth and so clean that I did not even care to touch it with a sponge. When the tube was loosened the uterus became violet.

Remarks on the Operation.—I take it to be a valuable improvement to turn out the uterus before opening it, as advised by P. Müller. It is true that this necessitates a somewhat longer incision through the abdominal wall, but I do not think the difference will be more than one

or two inches, for, in order to incise the uterus in the proper place, *in situ*, we have to go at least two inches above the umbilicus, as I did in my first case, and in this last one I could turn out the uterus by extending the incision four inches above the umbilicus. Even those who are opposed to turning out the uterus before opening it, do so after the removal of the child. Consequently they extend the incision to the same point downward as when the uterus is turned out beforehand. But we must remember that the abdominal wall is very elastic and recedes considerably when the uterus is pulled through it. It is, therefore, by no means necessary to extend the incision as high up as the uterus reaches. The fundus stood seven inches above the umbilicus, and still it could pass through an incision that went only four inches above that point.

By turning out the uterus before opening it we have the great advantage that we can surround the cervix with a soft rubber tube and thereby control all hemorrhage (Esmarch's method). I take it to be better to let an assistant hold the ends of the tube with his hands than to fasten them with a clamp or even to tie them as advised by others. If any part of the fœtus be caught in the constrictor the assistant can loosen it and immediately tighten it again after the operator has liberated the imprisoned part. In my first case there was considerable hemorrhage from the uterine sinuses, which it sometimes might be hard to control. In the last hardly any blood was lost during the operation. But, on the other hand, there was some hemorrhage after the constrictor was taken away. This is said to take place in all cases in which the constrictor is used.[1] It is due to the return of the dammed-up blood into the empty vessels below the constriction. The tube ought, therefore, to be loosened very slowly in order to let the equalization take place gradually.

To sew the peritoneum to the rest of the abdominal wall (Leopold) is not necessary. It is more expeditious merely to leave the two pairs of compression forceps on it, so as to find it readily when the abdominal wound is to be closed. But to put in sutures at the upper end of the incision before turning out the womb (Frank) is an excellent thing. Having seen how much another operator was troubled by the intestines coming out through the large opening behind the empty uterus, I inserted sutures before turning out the uterus, and tied them before opening that organ. The result was that I did not even see the intestines, and that no fluid entered the peritoneal cavity.

It is much better to help the head out first than to seize a foot, as taught by the old and some modern authors. When we lift the head out, the body follows without any difficulty; whereas, when extraction is made by the feet, it sometimes happens that the uterus contracts

[1] Zweifel: Archiv für Gynäkologie, vol. xxxi. p. 199.

around the child's neck, exposing it to great danger of suffocation, and necessitating a dilatation of the wound in the uterus.

In making the incision in the uterus care should be taken not to extend it into the lower uterine segment, that is that part of the womb which after the delivery of the child is thin, and which perhaps simply is part of the cervix. That happened to me, as it has to many others, and the difficulty is that the line of demarcation between the thick and the thin part of the womb, cannot be seen beforehand. I began my incision just at the line separating the fundus from the body, but it would have been better to go an inch higher up here and save as much at the lower end. In this respect the incision in my first operation was better. The large veins found on this so-called lower uterine segment may cause a troublesome hemorrhage, or the abundant loose connective tissue found under the peritoneum in this locality become the seat of a hæmatoma.

For suturing the uterus strong curved needles are necessary. I used this time round, trocar-pointed needles, which enter easily and do not cut any vessels. For the peritoneal suture a finer, curved, round, simply pointed needle is the best. For the abdominal wall I prefer Spencer Wells's long, straight, triangular needles.

Many complicated sutures for the uterus are described by different operators. All that is needed is a simple interrupted suture, avoiding the endometrium, and folding in the peritoneum, so as to bring serous surfaces into contact, both of which were done by Dr. S. S. Lungren, of Toledo, Ohio,[1] before the new literature on Cæsarean section was begun. How many of these deep sutures are necessary is to be decided in every particular case by the judgment of the operator. In this latter operation I used only six.

If we insert few deep sutures, a second series of superficial ones, only comprising the peritoneum, ought to be introduced between the others. Some try to make a whole cover of peritoneum over the first row of sutures, but that is not necessary and not always possible. I simply introduced the needle half an inch from the edge, pushed it out a quarter of an inch from the edge, introduced it again a quarter of an inch from the other edge, and pushed it out half an inch from the edge. By drawing the suture together the two linear surfaces a quarter of an inch in length are brought into apposition, and there is even left a little curtain that will be folded in between the suture and the line of incision, and contribute to a more complete closure of the uterine cavity. It will be noticed that this is somewhat different from Lembert's intestinal suture, in which the needle is pushed out and reintroduced exactly at the edge of the wound.[2] In both of my operations, and in the one

[1] American Journal of Obstetrics, 1881, vol. xiv. p. 92.

[2] Bardeleben: Lehrbuch der Chirurgie, Berlin, 1872, vol. iii. p. 666.

described by Dr. Lusk,[1] in which I assisted him, this was easily done. Zweifel,[2] on the other hand, has found cases in which it was impossible to fold the peritoneum, but in these the peritoneal edges came in close apposition on tying the deep sutures.

I used exclusively silk sutures, and take them to be preferable to any other. Catgut is hard to tie and is very liable to become untied when used on the uterus. I would not recommend silver wire. Those who are not accustomed to work with it, would find it much more difficult to get a nice adaptation of the edges. The folding in of the peritoneum must be more difficult when silver is used. It is not always easy to find good silver wire. Thus, in Obermann's[3] hands six silver sutures out of eight burst, and had to be replaced by silk. I think aseptic silk is the best of all, but I would not rely on that sold in the stores. I prepare mine myself by boiling it for half an hour, immerse it in bichloride solution (1 : 1000) for another half hour, and keep it wound on glass spools in alcohol.

The great value of a good uterine suture is indirectly shown in an interesting paper by Krukenberg,[4] in which he has collected all the cases he could find of rupture of the uterus in a subsequent pregnancy after Cæsarean section. Sometimes the rupture took place in the cicatrix, and the child was expelled into the abdominal cavity. In another series the rupture occurred likewise in the cicatrix, but the rent was smaller, and the child remained in the uterus. In yet other cases the uterus ruptured in another place than the cicatrix.

Kehrer[5] has advised to aim at producing coalescence between the uterus and the abdominal wall, and washed the peritoneum with a strong solution of bichloride (1 : 1000) for the purpose. I think it would be better, if possible, to avoid it. I used only a very weak solution, and only with the object in view to protect the uterus from contact with hospital air. During convalescence it sank considerably, but still became fastened to the abdominal wall.

The same author[6] gives another advice which strikes me as worthy of being followed, namely, to insert the deep uterine sutures before removing the placenta. By so doing we would let nature have a little time to prepare the uterus for the removal of the after-birth, and still not lose any time in simple idle waiting.

In a typically clean operation as the above described there is no call for any kind of drainage. The abdominal cavity might be washed out with some disinfectant fluid or plain water if anything dangerous, such

[1] Lusk, in New York Medical Journal, 1887, vol. xlv. p. 505.
[2] Zweifel, in Archiv für Gynäkologie, 1887, vol. xxxi. p. 197.
[3] Obermann: Archiv f. Gynäk., 1886, vol. xxvii. p. 275.
[4] Krukenberg: Archiv f. Gynäk., 1886, vol. xxviii. p. 421.
[5] Kehrer: Archiv f. Gynäk., 1886, vol. xxvii. p. 259.
[6] Ibid., p. 257.

as putrid liquor amnii or meconium had found its way into it, but then the cavity ought to be closed. If later there arise dangerous symptoms, the abdominal wound may be partly reopened and a drainage tube inserted, in order to pump out by means of a glass syringe with adapted soft-rubber tube, or Hegar's wire wound with absorbent antiseptic cotton, what fluid may collect in the peritoneal cavity, or a soft-rubber drainage tube with cross-bar may be carried through an opening made in Douglas's pouch to the entrance of the vagina.

To leave a drainage tube in the uterus, as I did in my first case, is objectionable, as it may become a source of infection. If the cervical canal is open, the lochial discharge will find its way out through it, and if it is not, the cervix must be dilated during the operation.

Leopold[1] injects ergotin into the uterine wall before loosening the tube around the cervix. It seems to me that this is to run an unnecessary risk. How often are not abscesses, or at least painful inflammations produced when drugs are injected under the skin, and to what dangerous, nay fatal consequences might such an event lead, if it took place in the uterus.

The temptation to remove the ovaries and thereby protect the woman against all dangers from subsequent pregnancies is great indeed. Still, I believe it is better not to yield to it. Although it might be done in a few minutes, it would, in my opinion, complicate the operation and enhance the risk. After oöphorectomy the patient has very considerable pain for a whole week, which probably comes from the constriction of the nerves in the pedicles, and two stumps are left in a condition in which they cannot be nourished before new channels of supply have been opened. I think we ought to be satisfied, if we can bring the patient safely through the infliction and healing of the unavoidable wounds, without complicating the case by the addition of unnecessary and dangerous elements.

It is, upon the whole, a great question if it is justifiable gratuitously to deprive a woman of the possibility of again becoming a mother. If, in view of the fact that these operations are almost exclusively performed on poor women who find it hard to rear their children, it is thought desirable to sterilize them, this might probably be done in a safer way by ligating the tubes. There can hardly be any doubt that many ovula fall into the peritoneal cavity, and are dissolved there without giving any trouble; but, on the other hand, blood from Graafian follicles, which otherwise might have found its way out through the Fallopian tube, may form a hæmatocele. Thus, taking everything into consideration, I think it better to limit the operation to the safe termination of the present pregnancy and not to include in it any kind of measure tending toward prevention of future pregnancies.

[1] Leopold: Archiv für Gynäkologie, xxviii. p. 464.

The question presents itself, What is the best way to deal with the omentum? To draw it down in front of the uterus might give rise to adhesions between it and the line of incision or the sutures, which might become dangerous by causing intestinal obstruction. Frank[1] has proposed to draw it down over the intestines behind the uterus and fasten it there with catgut. I simply pushed it up above the fundus of the uterus.

In closing the abdominal cavity care should be taken to include the aponeurosis in the sutures so as to strengthen the cicatrix as much as possible and try to prevent ventral hernia, which often is a sequel to laparotomy, especially when the incision has been long. In order to prevent this accident, Keith puts in about four sutures to the inch.[2] Recently I observed very good union of the whole thickness of the wall at the autopsy of a woman who had died six days after the removal of the fibrocystic uterus, and where only one suture had been passed to the inch.

I used old sponges. The flat sponges which are so useful in laparotomies are so expensive that it would be quite an item if they had to be new every time. In order to clean used sponges I press them out in lukewarm water till the water remains clean; then I leave them for an hour in diluted liquor potassæ (℥j to the quart of water) which draws out all the blood. In exceptional cases it may become necessary to change this solution. Then the sponges are again wrung out in plain water till it stays clean. After that I leave them for an hour in a solution of bichloride of mercury (1 to 2000), dry them in front of a fire and keep them in a muslin bag. By being kept dry they do not become rotten so soon as when they are kept in some antiseptic fluid. Before using them the next time they are left a short time in a similar solution of bichloride, wrung out, and kept in carbolized water (2 or 2½ per cent.) or a weak solution of bichloride (1 to 5000), during the operation.

New sponges give nearly as much trouble to prepare. Even when they are bought prepared they have to be immersed for an hour in acidulated water (hydrochloric acid ℥j to every quart of water) in order to dissolve the lime concretions they contain, and be wrung out many times in water before all sand is out of them.

When my antiseptic pad is used no vaginal injections are called for unless complications should turn up.

I changed the dressing on the eighth day. It might, perhaps, even be left for ten days with advantage in such a feverless case.

For vomiting, which often is so troublesome after operations, I have

[1] Frank: Centralblatt für Gynäkologie, 1881, vol. v. p. 603.

[2] Keith: Contributions to the Surgical Treatment of Tumors of the Abdomen. Part I. Hysterectomy for Fibrous Tumors of the Uterus. Edinburgh, 1885, p. 14.

found black coffee and compound tincture of iodine in one minim doses every hour to be the best two remedies.

The operation of Cæsarean section has reached such a degree of perfection that I believe it is safer for the mother than *difficult* extraction through the natural passages. While we rarely see a considerably flat pelvis here, there is a form which is by no means rare, that is, a pelvis with a moderate general contraction with male type. In such cases I have several times had to perform very difficult operations resulting in the loss of both mother and child. Still, we will have to wait yet and see the result of the Cæsarean operation, since it has been surrounded by all the safeguards of modern surgery, before we decide to what extent it should replace craniotomy. So far, the results in this country are by no means satisfactory. Dr. R. P. Harris wrote me recently that there had been 11 Cæsarean operations from December 16, 1886, till February 24, 1888, inclusive of my own, in the United States, all of them by the improved method but one; saving 6 women and 8 children. 6 of the operations were performed in hospitals, saving 5 women, 5 in private practice saving only 1. Of the children, 5 were saved in the hospital cases and 3 in the private cases. All of the 5 hospital cases operated on by the improved method were successful. If we ask why this great mortality has obtained in private practice here as compared with hospital cases here and in Germany, I think I do not err in surmising that the chief reason is to be found in the defective use of antiseptics in private practice.

All the German operations I have read of were performed in hospitals, which—how different from a few years ago!—have now become the safest place to be delivered in. In Germany even midwives are held by law to use antiseptic precautions in every case of confinement. In this country antiseptic midwifery is yet in its infancy. I believe it has been adopted, more or less, in lying-in asylums, but as to private practice the progress is yet very small. Most physicians do not use any antiseptic precautions at all. Others have recourse to imaginary ones, such as carbolized soap or vaseline. The consequence is that in difficult labors infection is likely to have taken place before even the question of Cæsarean section presents itself to the mind of the physician. If we will obtain similar results as the German operators we must do as they do, decide beforehand that Cæsarean section is to be performed, desist from all attempts at delivery by other methods, avoid unnecessary vaginal examinations, operate as early as possible, and observe the strictest antisepsis before, during, and after the operation. One reason why the German hospitals have had such brilliant results is that the physician-in-chief has autocratic power. As soon as a case comes to the hospital that is suitable for Cæsarean section, his assistant calls his attention to it, and he decides at once whether and when the operation

shall be performed. If we will follow old rules and call numerous colleagues and consultants together and examine and debate, we will either not perform Cæsarean section or run great risk of losing our patients. The bruising of the soft parts of the genital tract occurring during protracted labor predisposes to puerperal inflammation, and ought, therefore, if possible, to be avoided.

In the same letter Dr. Harris writes that my case of improved Cæsarean section is No. 163 on his list of Cæsarean sections in the United States, which is the same number as he has collected of cases of symphysiotomy, by which latter 115 women were saved against 62 by the Cæsarean section. 88 children escaped under the operation of Sigault, whereas only 62 were saved in the United States by gastrohysterotomy. Still I would warn American physicians against giving the preference to symphysiotomy over Cæsarean section. When Morisani laid the results gained by symphysiotomy before the profession at the International Medical Congress in London, 1881, I became much interested in that operation, had a Galbiati's falcetta sent me from Naples, and tried it several times on the cadaver, sometimes with success, but sometimes not. The operation is only claimed to be indicated on a certain field between the forceps and the Cæsarean section. Commonly a conjugate of 2¾ to 3¼ inches (68 to 80 millimetres), just the degree of narrowness where Sir James Y. Simpson advised to prefer turning to the forceps, is said to be its domain.[1] It is not always possible to divide the symphysis, except by means of a chain-saw, and from the histories it appears that the patients not infrequently have had to go through a protracted sickness, and sometimes have become invalids for the remainder of their lives. If anything of the kind should happen in this country, the physician would risk a suit for malpractice, and might have to pay heavy damages.

The Cæsarean section is not a particularly difficult operation, and in contradistinction to other laparotomies and most obstetrical operations it does not call for peculiar or expensive instruments. A knife, a pair of scissors, a rubber tube, needle, and silk, are the only indispensable instruments, but it is useful to have a few pairs of compression forceps. It is hardly wise to undertake such an operation without two or three assistants, which is one reason among others why Cæsarean section will not drive craniotomy from the field in private practice.

Modus operandi.—So many small changes have taken place since I described the operation in my first paper, that it may, perhaps, be found convenient by some readers to have the different steps of it briefly set forth here again.

The best time for the operation is as soon as labor pains have become strong and frequent.

[1] Luigi Mangiagalli, in Annali di Ostetricia, January, 1883, p. 4.

The first part of the operation is identical with that of ovariotomy. The bowels and the bladder having been emptied, and the pubes shaved, the abdomen is washed with soap, ether, and 1 : 2000 solution of bichloride of mercury. The vagina is syringed with two quarts of the same solution, and thoroughly rubbed off with cotton dipped in it, which is best done with a Sims's speculum, and in his position. The operator and his assistants disinfect themselves and the sponges with the solution. The instruments are kept in carbolic acid solution (two and a half per cent.). The temperature of the room ought to be about 80° F. The patient is placed on her back, on a long narrow table covered with a mattress, quilts or blankets, a rubber sheet or oilcloth, and a common sheet. Her legs are bent at the knees, and the feet placed on a stool at the end of the table, so that the assistant who takes care of the rubber tube may have easy access to the uterus without being in the way of the operator or the other assistant. She ought to be warmly dressed. She is anæsthetized. The field of operation is surrounded by four towels wrung out of carbolized water (two and a half per cent.). The operator stands to her right, and his chief assistant to her left, the one who anæsthetizes at her head, and the one who has charge of the constrictor at her knees.

By percussion the operator ascertains that no intestines are present between the uterus and the abdominal wall, or pushes them aside. An incision is made in the median line through the skin and the linea alba from the umbilicus to a point an inch and a half above the symphysis pubis. Bleeding vessels are clamped by means of compression forceps. Next the peritoneum is lifted up with two such pairs of forceps, and a small incision made in it, through which the index is passed into the abdominal cavity, and the peritoneum slit open to the same extent as the incision in the skin. The incision is carried through the whole thickness of the abdominal wall up to the left of the umbilicus, just enough to allow the uterus to be pulled through. The uterus may be helped out by pressure from the vagina, and one of the corners is pulled out first. Before doing so, long silk sutures are inserted at an inch distance from one another through the lips of the abdominal incision above the umbilicus. The two ends of each are clamped or tied together. As soon as the uterus is lifted out it is wrapped up in cloths wrung out of a warm solution of bichloride (1 : 10,000). The sutures are closed. A finger-thick rubber tube, half a yard long, is laid loosely around the cervix, and a flat sponge placed in front of and behind the uterus. The moment the operator puts the knife to the uterus, the lower assistant tightens the constrictor. An incision is made in the median line of the uterus so as to avoid the cervix, but long enough to allow the hand to be introduced and the child to be withdrawn with ease, say four and a half to five and a half inches. This incision is best begun with a convex sharp-pointed bistoury,

and continued with a probe-pointed one. If the placenta is in the line of incision it is cut through, together with the uterine wall.

If the waters have not broken, the operator tears the membrane near the lower end of the incision so as to prevent the escape of the liquor amnii, especially if it is decomposed, into the peritoneal cavity. The operator introduces his hand immediately through the rent and seizes, if possible, the head of the child, if not, the breech or the feet. The cord is tied, and the child given to a competent nurse, or, preferably, a doctor, who, if it is asphyxiated, uses proper remedies for its revival.

Now deep silk sututes are inserted half an inch from the edge through the uterine wall, except the decidua. The distance between the sutures ought to be about three-quarters of an inch The ends of each suture are clamped or tied together.

Next the after-birth is removed by peeling the membranes off in one piece. If there are any clots in the uterus, they are turned out and the inside is washed with bichloride and dusted with iodoform.

Next the deep sutures are closed, the assistant approaching the edges by means of two tenacula and folding as much as possible of the peritoneal covering in between the edges. Thereafter fine silk sutures are passed superficially between two and two of the deep ones, only comprising the peritoneum. If this is movable enough the needle is passed in half an inch from the edge, out on the same side a quarter of an inch further in and reintroduced in the corresponding points on the opposite side of the incision. While they are being tied the assistant takes off the strain with two tenacula. A hypodermatic injection of fluid extract of ergot or two grains of ergotin is made on the extensor side of the left forearm. The rubber tube is loosened very slowly and left in place. If there is any hemorrhage from the wound that does not stop on simple pressure with a hot sponge, extra sutures are passed under bleeding spots. If this cannot be obtained by the simple interrupted suture, a so-called mattress suture may be substituted. A curved needle is introduced in the usual place, passed under the bleeding sinus and out on the same side. A similar suture is inserted in the corresponding point of the other lip, and in tying the sutures the two upper ends are united, and so are the two lower ones. The uterus is squeezed, and if the hemorrhage continues an intrauterine injection of solution of bichloride (1 : 5000) is given so hot that the hand can just be held in it (110° to 115° F.). In exceptional cases injection of tincture of iodine or diluted liquor ferri chloridi (1 : 10), or faradization might be called for. When the hemorrhage is controlled the constrictor is removed.

The peritoneal cavity is cleaned with sponges held in long forceps, and if decomposed liquor amnii, meconium, or other dangerous material has got into it, it is washed out with plenty of plain warm water. The

uterus is replaced and the omentum pressed up above it. The abdominal wound is closed with deep silk sutures comprising the whole thickness of the wall, and special attention is paid to include the aponeurosis of the muscles and the peritoneum. They are passed at intervals of an inch, and superficial ones, through the skin alone, between them.

Dressing.—The wound is dusted with iodoform, covered with a piece of gutta-percha tissue, a pad of iodoform gauze, and a thick layer of borated or salicylated cotton fastened with broad straps of rubber adhesive plaster to the sides of the abdomen. The usual belly binder is put on.

The genitals and anus are covered with a pad of absorbent cotton or lint wrung out of bichloride (1 : 2000); outside of that is placed a piece of gutta-percha tissue, then a layer of dry cotton batting, and a piece of muslin is fastened to the belly binder in front and behind.

After-treatment.—The patient is placed in a bed with bottles filled with hot water. As soon as she can swallow she is given alcoholic drinks or hot, strong coffee. Pain is subdued by small doses of morphia. After the patient has recovered from shock she may have light liquid food, and after a few days meat and other solid food. The urine is drawn with a catheter if she cannot pass it herself. The bowels are kept open by enemas or aperients.

If the temperature rises, it is combated by antipyrin, quinine, salicylic or carbolic acid, and cold applied to the head and abdomen by ice-bags or rubber coils. Vomiting is treated with coffee, tincture of iodine, bismuth, hydrocyanic acid, strychnia, creasote, carbolic acid, carbonic acid water, counter-irritation over the pit of the stomach, etc. Peritonitis is either treated with large doses of morphia or perhaps preferably with a saturated solution of a saline aperient (L. Tait). If a collection of pus in the peritoneal cavity can be diagnosticated, the lower end of the abdominal incision is reopened, an opening made in the vaginal cul-de-sac and drainage established, combined with antiseptic injections; or an incision is made in the vagina and drainage established in that way. A weak and frequent pulse due to anæmia and weakness of the heart calls for hypodermatic injections of digitalis or camphor dissolved in ether, or intravenous injection of a weak alkaline solution of chloride of sodium.[1]

In favorable cases the abdominal dressing may remain undisturbed for a week or ten days. Then the sutures are removed and replaced by long, narrow strips of rubber adhesive plaster. The perineal dressing is changed every six hours, and the genitals syringed outside with bichlo-

[1] Swartze's method: Sodium chloride 6 parts, ammonium carbonate 1 part, distilled water 1000 parts. A quart, for an adult, is usually injected (Centralblatt für Gynäkologie, 1882, p. 477; 1885, p. 809). Modifications of the method are to inject the fluid into the subcutaneous areolar tissue or into the peritoneal cavity.

ride (1 : 2000). No vaginal douche is given under normal circumstances. If the lochia become fetid and the temperature rises, the vagina is syringed every three hours, and even an intrauterine injection given as in other cases, followed by an intrauterine suppository with iodoform.[1]

SYRINGOMYELIA: ITS PATHOLOGY AND CLINICAL FEATURES.

WITH A STUDY OF A CASE, AND REMARKS UPON ITS DIAGNOSIS.[2]

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There are many diseases of the nervous system, whose history is so typical, and whose symptoms are so evident, that a brief inquiry and a cursory examination lead at once to their diagnosis. There are others, however, in which the symptoms must be discovered by a painstaking investigation, and the history must be analyzed with care in order to unravel its perplexing intricacy. It is to this latter class that syringomyelia belongs. It is an affection of the spinal cord, which has, of late, awakened much interest in Germany, but of which no record has, as yet, appeared in this country. And yet it is not less common than such a well-known disease as disseminated sclerosis, and Bäumler,[3] in a recent monograph, has been able to collect 112 cases. No apology, therefore, is necessary for calling the attention of the profession to this disease, as it is very probable that many cases of it exist undiagnosticated.

Syringomyelia (*συρίγγω*, to become hollow; *μυέλος*, spinal marrow) is a condition of the spinal cord in which abnormal cavities are present within that organ. Such cavities have been recognized as a pathological curiosity for two centuries, and had been described under various names until 1838, when Ollivier[4] proposed the name now in use. But since 1860 a distinction has been made between two kinds of cavity in the cord, and much discussion has ensued regarding the pathology of this condition. It has been shown that cavities within the spinal cord may be due either to a dilatation of the central canal, termed hydromyelus, in which case cylindrical epithelium lines the cavity; or to a disintegration of the spinal cord, occurring subsequently to an infiltration of its substance with gliomatous cells, in which case the cavity is surrounded by

[1] Antiseptic Midwifery, p. 59.
[2] Read before the New York Neurological Society, April 3, 1888.
[3] Bäumler: Deut. Arch. f. klin. Med., Bd. xl. S. 443, 1887.
[4] Ollivier: Mal. de la Moelle épinière, troisième edit., 1838.

dense gliomatous tissue, and its walls are made up of neuroglia and flat cells. Hydromyelus is a congenital malformation; syringomyelia is an acquired disease.

The *pathology* of syringomyelia is now pretty well understood. The disease begins with the appearance of small cells infiltrating the substance of the spinal cord,[1] near to the central canal, and either in the gray matter of this area, or in the anterior part of the posterior columns. These cells are connective tissue nuclei or embryonal cells, and their increase is accompanied by a production of fine neuroglia-like substance infiltrating or pushing aside the normal elements of the spinal cord, until there exists in this cord a glioma of greater or less extent.[2] Such gliomata have a great tendency to disintegration; and hence, in the centre of such an infiltrated area, a breaking down of the tissue soon begins, giving rise to the cavity. Such a cavity is usually situated in the central portion of the cord, with greatest frequency invading the central gray matter about the commissure; but often extending backward into the posterior gray horns, or into the posterior columns; and sometimes advancing forward into the anterior cornua. It is usually irregular in shape, and may be either unilateral or bilateral. The length of the cavity varies, as does also its calibre at different levels. At places it may be merely a narrow fissure in the cord, at others it may be a large opening sufficient to admit the tip of the finger. It may also have lateral diverticula, which extend upward or downward a short distance, so that in cross section of the cord two cavities are seen. It may even divide into two parallel cavities, which unite again below, or terminate in blind ends. The cavity may communicate with the central canal, but usually this is pressed forward and obliterated rather than opened into. When such a communication exists, it may appear as if the new cavity were an extension of the central canal, and due to internal pressure of fluid having produced a rupture of the wall; but this explanation of syringomyelia at first urged by Leyden,[3] and receiving some support from Westphal,[4] appears to have been erroneous. The longitudinal extent of the cavity varies greatly. It may only extend through a few segments of the lower cervical and upper dorsal regions; or it may be found at all levels of the cord. In almost all cases, the lower cervical and upper dorsal regions have been affected; and this is the favorite situation of the lesion. The wall o the cavity consists of a peculiar, thick, felt-like pigmented connective tissue, which extends into the cord for some distance beyond the blind ends of the cavity. The cavity is filled by fluid, which may be thin and serous, or bloody, or thick and gummy, or even by a hyaline mass. Such a cavity has never been known to

[1] Schültze: Virchow's Archiv, Bd. 87, S. 510.
[2] Also, Bd. 102.
[3] Leyden: Klinik d. Rückenmark, ii. S. 452.
[4] Westphal: Arch. f. Psych., v. 90.

rupture outward, hence the internal pressure of the fluid cannot be great. But, in the majority of the cases, the pathological process appears to be gradually progressive, with occasional stationary periods, until destruction of the cord is so far advanced as to destroy life.

The *clinical features* of syringomyelia have only recently been made out. Even in 1878, Erb[1] was compelled to state in Ziemssen's *Cyclopedia*, that "all experience thus far teaches that the development of cavities as such produces no sort of symptoms by which it could be recognized during life; no peculiarity in the course of the disease betrays this complication."

A review of the collection of cases made by Bäumler, sixty-six in number, in which a careful history has been completed by a full post-mortem record, seems at first to bear out this statement. For there appears to have been every variety of symptoms, from an entire absence of spinal symptoms,[2] the cavity having been found unexpectedly after death, to a most widespread series of nervous manifestations. But a more careful examination of the records reveals the fact that in these cases certain erroneous diagnoses appear to have been made with considerable frequency.

Thus, in cases recorded by Gull,[3] Clarke,[4] Westphal,[5] Kahler and Pick,[6] Schültze,[7] Dreschfeld,[8] Schüppel,[9] and many others, the diagnosis of progressive muscular atrophy had been made during life, though peculiar sensory symptoms had been noted in the histories. In other cases, the diagnosis of spastic paralysis,[10] of amyotrophic lateral sclerosis, of tabes dorsalis,[11] had been made by competent observers. Schültze[12] was the first to point to certain symptoms which might be taken as diagnostic of the disease, and it is largely to his series of articles on this subject that our clinical knowledge of syringomyelia is to be traced, although the contributions of Furstner and Zacher,[13] of Bernhardt,[14] of Oppenheim,[15] of Wichmann,[16] and of Bäumler,[17] deserve mention.

The situation and extent of the lesion found should give a clew to the symptoms to be expected in this class of spinal cases. The lesion is a

[1] Erb: Ziemssen's Cyclop., Amer. Ed., xiii. p. 800
[2] Simon: Arch. f. Psych., v.
[3] William Gull: Guy's Hosp. Reports, viii., 1862.
[4] Lockhardt Clarke: Med. Chirurg. Trans., li.
[5] Westphal: Brain, vi. 147.
[6] Kahler und Pick: Beitrag zur Pathol. d. Central. Nervos. System. Prag, 1879.
[7] Schültze: Arch. f. Psych., viii. S. 367.
[8] Dreschfeld: Brain, viii. p. 168. Cases I. and II.
[9] Schüppel: Arch. f. Heilkunde, iii. 289, viii. 113.
[10] Strümpell: Arch. f. Psych., x. 696.
[11] Oppenheim: Charité Annalen, xi. 1886.
[12] Schültze: Verhandlungen d. Congr. f. Inn. Med., 1886, v. 435. Zeitschr. f. klin. Med., xiii. 525, 1888.
[13] Furstner u. Zacher: Arch. f. Psych., xiv. 455.
[14] Bernhardt: Neurol. Centralbl., 1887, p. 307.
[15] Oppenheim: Charité Annalen, xi., 1886.
[16] Wichmann: Geschwulst und Hohlenbildung. im Rückenm. Stuttgart, 1887.
[17] Bäumler: Deut. Arch. f. klin. Med., Bd. xl. S. 443, 1887.

slowly progressive one; hence the disease is chronic. It is situated with great frequency in the lower cervical and upper dorsal region of the cord, hence the symptoms will present themselves most often in the upper extremities. It invades both posterior and anterior gray matter of the cord; hence, sensory disturbance and atrophic paralysis are to be expected. It starts, in the majority of cases, in the central gray matter, and this fact will warrant the expectation of trophic and vasomotor symptoms.

Looked at in this manner, it becomes evident that certain clinical features may be reasonably inferred from the lesion found. And in fact, when the recorded histories are reviewed in the light of the post-mortem findings, this expectation is found to be fulfilled.

A few cases may now be considered in order to obtain a clinical picture, and those which are chosen display the prominent features of the disease, the presence of which alone will warrant a diagnosis.

In June, 1887, Bernhardt presented to the Berlin Neurological Society[1] the following interesting case, his diagnosis of syringomyelia being supported by Remak and Oppenheim.

CASE I.—A female, forty years old, had, for several years, noticed an increasing weakness of the left arm, which had not, however, become complete paralysis. The smaller muscles of the hand had slowly atrophied. The hand appeared to be swollen and ulcerated, and bullæ were found on several spots. The ulcers and bullæ did not seem to cause the patient any pain, and had not prevented her from working, although her work had prevented them from healing. Examination showed a complete loss of sense of pain in the entire left arm and shoulder, which extended down the trunk to the mamma, and over the back to the shoulder blade, and upward to the chin. Pin pricks, the electric brush, and the hot iron, were not perceived in this area. Tactile sense was, however, quite normal, and pressure or changes of position were at once recognized, as was also the movement of the muscles produced by the electric current. The left pupil was larger than the right one. The affection was stationary.

CASE II.—Male, forty-three, admitted to Heidelberg Hospital in July, 1886. Fourteen years before he had suffered from a burning sensation back of the right ear, and soon after from right-sided headache. Twelve years before, after manual labor, he had noticed a shooting pain in the second and third fingers of his left hand, which was felt especially on coughing or sneezing; soon after a weakness of the left hand, and a wasting of the muscles between the first and second fingers were noticed. During the next three years a gradual atrophy extended over the entire hand and forearm, without rigidity, but with *main en griffe*. Then pains in the left arm on coughing began, and later a biting or sticking feeling in the region of the dorsal vertebræ, which led him to rub and scratch his back. For ten years burning and biting pains in the skin of the entire left arm, shoulder, and left half of the thorax had been present. At the same time that these began the secretion of sweat ceased in the entire left half of the head and thorax and arm. He also noticed a loss of pain sense in the left arm, and an impairment of temperature sense. The left breast was, however, unduly sensitive to cold. Fibrillary motions in the muscles were not noticed, but the fingers jerked at times. For one year past the left leg had dragged a little, and occasionally involuntary spasms and cramps in the calf and twitching of the toes were felt. The feeling in the left

[1] Bernhardt: Neurol. Centralbl., 1887, p. 307.

leg had also diminished. The same was true of the right leg to a less degree. For the past six months a slight loss of pain sense in the right arm had been present, as an ulcer on the elbow was not noticed by him. Occasional headaches, constipation; no other symptoms.

Examination.—Right pupil larger than the left. Right ear and back of head insensitive to pain or to cold. Left ear insensitive to pain, but feels cold or heat. Left arm atrophied in its entire extent except the deltoid, biceps, triceps, and supinator longus. The left shoulder muscles were not atrophied, except the trapezius, which was only normal in its upper part. Sterno-mastoid, supra- and infra-spinatus, teres, latissimus dorsi, pectorals, and rhomboid were normal, but the serratus magnus was very much atrophied. Right arm normal, except for slight flabby condition of the hypothenar muscles, and adductor pollicis, of the extensors and flexors of the wrist, of the outer half of the biceps. The deltoid was rather weak and soft. The upper third of the trapezius also weak and flabby. The supra- and infra-spinatus were atrophic, but other shoulder muscles were normal. Fibrillary contractions are noticed in the muscles, but no rigidity. Tremor of fingers of left hand. The left leg was smaller than the right and slightly rigid, but its powers were good. There was a scoliosis of the dorsal region toward the left. The atrophied muscles showed complete reaction of degeneration to the electric current. The measurements showed the left arm to be small, and even the circumference of the fingers was one to two centimetres less on the left side.

As to sensation, while touch, tickling, and sense of location were perfect on the left arm, there was total loss of pain sense, and sense of temperature to heat and cold. The same was true of the right arm, and of both halves of the thorax down to the sixth rib. In the sixth intercostal space a small area was oversensitive to cold and heat. Hyperæsthesia to cold was also noticed in lower body and upper right thigh. Right half of scrotum and right testicle insensitive to pain or temperature. Where pain sense was lost, faradic sensation was also lost. Tendon reflexes of the arm lost, of the left leg increased with foot clonus. Abdominal and mammillary reflexes wanting. Sweat suspended on the left half of the head, neck, and breast. Diagnosis by Schültze is syringomyelia.—Fr. Schültze, *Zeitschr. f. klin. Med.*, xiii.

Case III.—Male, thirty-seven, began to suffer four years before his death from atrophy of the muscles of the left hand and forearm. Numbness and formication, and feeling of cold then began in the right arm and hand, and loss of power gradually developed in it, with tremor, and inability to write; until both upper extremities were weak and shrunken. He then suffered from headache, vertigo, burning sensation in the right half of head and face, and, finally, paræsthesia over the entire body. He died of bulbar symptoms. The autopsy showed a cavity nine centimetres long in the cervical portion of the cord, invading both anterior and posterior horns, and below it a gliosarcoma seven centimetres long extending into the dorsal region.—Westphal, *Arch. f. Psych.*, v.

Case IV.—Male, thirty-seven, first symptoms ten years before his death. Analgesia, formication in the entire right side with trophic disturbances in the right hand; loss of tendon and skin reflexes both right and left; total loss of temperature sense in the analgesic area. Tactile sense preserved. Right leg somewhat weak, and gait unsteady. Tremor of tongue. Facial paresis. Other symptoms referable to dementia. The most marked symptoms for eight years were vasomotor and trophic in nature. The skin became thick, the nails were hindered from growth, ulcerations of painless kind developed and healed with difficulty. Ankylosis in the fingers followed joint affections. Wherever the skin was rubbed, a red hue would appear, and soon become a broad urticaria-like elevation. Extensive syringomyelia of entire cord was found.—Furstner and Zacher, *Archiv f. Psych.*, xiv.

Case V.—Male, thirty-three, complained for a long time before his death of anæsthesia in both his hands and a gradually increasing weakness, the right hand being weaker than the left. Before death, extensive atrophy with paralysis was present in the arms, and the legs were also paralyzed. The upper part of the spinal cord was broad and fluctuating. This was due partly

to an infiltrated glioma, and partly to a cavity with a lining membrane in this region.—Wipham, *Lancet*, 1881, i. 418.

CASE VI.—Male, twenty-four, three years before his death, fractured his right arm while kneading dough, and one year after, fractured his right radius while at the same occupation. Eight months before his death, fractured his fourth and fifth left metacarpal bones, without any known cause. All these fractures were incurred without pain and the swelling around them was not tender, and pressure on the parts did not cause pain. He complained for a long time of numbness of the fingers.

The autopsy showed the existence of central glioma with a cavity. This invaded only the central region of the spinal gray matter and the posterior horns from the medulla oblongata to the mid-dorsal region. The anterior horns were in no way affected. The columns of Clarke were involved, but no secondary degeneration in the direct cerebellar tracts was to be found. —Schültze: *Virch. Arch.*, Bd. cii. 435.

CASE VII.—A young man suffered from an inflammation of the right hand which extended up to the elbow and assumed a phlegmonous character, but was not painful. Recovery ensued, but there remained a stiffness in the smaller joints. A few months later, the left hand was affected in the same manner. A careful examination revealed the fact that in addition to a muscular atrophy in the hands, there was loss of sensation to pain and to temperature in the entire arm, while touch was normal. Later the patient developed again abscesses in the hands, but as in spite of these and of ulceration he persisted in working, he died of pyæmia.

A large cavity was found in his spinal cord extending through the cervical and dorsal regions which had partially destroyed both the anterior and posterior gray horns and central gray substance.—Schültze, *Verhandl. d. Cong. f. Inn. Med.*, 1886, v. 438.

CASE VIII.—Female, thirty-five years old, noticed immediately after a fall, weakness and numbness of the legs, pain in the back, and difficulty in passing water. At first, she was unable to walk, but soon recovered this power. During the following three years, there developed gradually increasing weakness of the legs, shooting pains, marked ataxia, and loss of all forms of sensation with loss of reflexes and incontinence of urine. A girdle sensation with anæsthesia was present from the fourth to the eighth rib. Arms and head free from symptoms. The anæsthesia of the legs continued, but cold was felt as heat in them. Reaction of degeneration was found in the left peronei muscles Finally, bedsores and cystitis caused her death. The autopsy showed a glioma, at the level of the fourth to sixth dorsal segments, within which a cavity existed. From this glioma the cavity extended downward through the entire dorsal region, occupying the posterior columns of the cord. These columns were degenerated in their entire length.

The chief interest in this case is in the etiology, the influence of trauma being unmistakable. The changes in the cord were the result of glioma.

The author adds to this the history of three cases in which progressive muscular atrophy of the arms had been associated with loss of temperature and pain sensations in the hands, arms, and thorax, and with peculiar bullous eruptions on the fingers, and he calls attention to the fact that none of these patients was aware of the disturbance of sensation.—Oppenheim, *Charité Annalen*, xi.

From these cases, it must be evident that certain symptoms in a certain combination are characteristic of syringomyelia. These are, first, progressive muscular atrophy, with paralysis affecting some or all of the muscles of one limb, and usually extending to the opposite limb, and to the body, sometimes attended by a reaction of degeneration in the paretic muscles. Secondly, vasomotor and trophic disturbances in the affected limb, consisting of cyanosis, coldness, bullous eruptions, ulcera-

tion, abscesses, and even atrophy and fragility of the bony structures, and a diminution in the excretion of sweat. Thirdly, peculiar sensory disturbance, consisting of a loss of the sensations of pain, and temperature in the atrophied part, while the senses of touch and location may be preserved.

The extent of these symptoms in any one case deserves a moment's consideration. It is now admitted that each group of cells in the anterior horns of the cord presides over a combined physiological movement and governs several muscles which act together, to carry out a special act.[1] Destruction of these groups of cells produces different effects according to the groups affected.[2] Those in the upper part of the cervical enlargement are related to the act of raising the hand to the mouth, an act which calls for simultaneous contractions in the deltoid, biceps, brachialis anticus, and supinator longus muscles; and when this act is arrested, the so-called upper arm type of paralysis is present, and the muscles named are paralyzed. Those in the middle of the cervical enlargement are especially related to the act of placing the hand on the anterior or posterior surface of the thigh, the scapular muscles, the flexors and extensors of the forearm and wrist being called into play. Paralysis of these groups of cells affects the muscles around the scapula and on the forearm. Those in the lower part of the cervical region are especially related to the hand, its flexion and extension, the motion of the intrinsic palmar muscles being governed by these groups. Hence, their destruction prevents the finest acts of thumb and fingers, or the proper use of the hand, causing the lower-arm type of paralysis.

A similar distinction is made in the action of groups of cells in the lumbar enlargement, the upper region presiding over flexion and extension of the thigh, the middle part governing the rotation, flexion, and extension of the leg, and the lower third controlling the movements of the foot. Certain reflex acts are also governed by these cells differing at different levels. The character of the paralysis and loss of reflex in any case of syringomyelia, together with the extent of atrophy in the muscles, will, therefore, depend upon the level of the spinal cord which is involved, and will vary much in different cases. And even when an entire limb is paralyzed, it may be found that some of the muscles are not wholly destroyed, thus indicating that at certain parts of the enlargement of the cord, the cavity is smaller than at others. The paralyzed muscles sometimes exhibit the reaction of degeneration, an important diagnostic symptom when present.

About the distribution of vasomotor and trophic symptoms little can be stated exactly, though they are always limited to the analgesic area.

[1] Remak: Arch. f. Psych., ix. p. 550.

[2] Ferrier: Brain, iv. p. 223.

In Case VI., it will be remembered that fragility of the bones was the only symptom of the syringomyelia, and in Case VII. cellulitis with abscesses led the patient to consult a surgeon (Czerny) rather than a physician. The forms of trophic and secretory disturbance present have been already mentioned.

The sensory symptoms require a word of explanation. When the gray matter of the posterior horn is alone affected, the disturbance is limited to a loss of the power of perceiving pain, and heat or cold. When the posterior white columns are affected, tactile and muscular sense may also be disturbed, but are never wholly lost. As to the distribution of these sensory symptoms, no exact statements are made in the histories given, the analgesic area not having been exactly mapped out. But the distribution to be expected will depend in any case on the level of the spinal cord which is destroyed. Our knowledge of the location of sensory functions of the various segments of the cord has been greatly increased of late by the contributions of Ross and Thorburn.[1] They have shown that if the upper part of the cervical region, fifth segment, is destroyed, the area of anæsthesia extends along the outer side of arm and forearm, from the shoulder to the wrist. If the middle cervical region, sixth to seventh segments, is affected, the skin of the anterior part of the forearm, and both surfaces of the outer half of the hand are rendered insensitive. If the lower cervical region, eighth cervical to second dorsal segments, is diseased, the anæsthesia extends along the inner side of hand, forearm, and arm, up to the axilla, the highest area of anæsthesia being related to the lowest of these three segments. Lesions in the dorsal region produce bands of anæsthesia at their level around the trunk. Lesions in the lumbar enlargement in its upper part cause anæsthesia of the front of the thigh and leg, especially on their outer surfaces. The skin of the foot, of the back of the leg, and of the back and inner part of the thigh, is related to the lower part of the lumbar enlargement, the lowest extremity of the spinal cord receiving sensations from the anus and posterior part of the scrotum.

Since the area of analgesia in syringomyelia will correspond to this location, it deserves to be carefully studied.

The following diagram, which was originally prepared in 1884,[2] from data gathered from comparative anatomy, physiological experiment, and records of spinal cord diseases, especially from the study of anterior poliomyelitis, transverse myelitis, and syringomyelia, and which has been somewhat modified and amended in view of facts published within the past four years, may aid in the localization of lesions such as those under discussion.

[1] Ross and Thorburn: Brain, Jan. 1888.
[2] Starr: Amer. Journ. Neurol., August, 1884.

Localization of the Functions of the Segments of the Spinal Cord.

Segment.	Muscles.	Reflex.	Sensation.
2d and 3d cervical.	Sterno-mastoid. Trapezius. Scaleni and neck. Diaphragm.	Hypochondrium (?). Sudden inspiration produced by sudden pressure beneath the lower border of ribs.	Back of head to vertex. Neck.
4th cervical.	Diaphragm. Deltoid. Biceps. Coraco-brachialis. Supinator longus. Rhomboid. Supra- and infra-spinatus.	Pupil. 4th to 7th cervical. Dilatation of the pupil produced by irritation of the neck.	Neck. Shoulder, anterior surface. Outer arm.
5th cervical.	Deltoid. Biceps, coraco-brachialis. Brachialis anticus. Supinator longus. Supinator brevis. Deep muscles of shoulder-blade Rhomboid Teres minor. Pectoralis (clavicular part). Serratus magnus.	Scapular. 5th cervical to 1st dorsal. Irritation of skin over the scapula produces contraction of the scapular muscles. Supinator longus. Tapping its tendon in wrist produces flexion of forearm.	Back of shoulder and arm. Outer side of arm and forearm to the wrist.
6th cervical.	Biceps. Brachialis anticus. Pectoralis (clavicular part) Serratus magnus. Triceps Extensors of wrist and fingers. Pronators.	Triceps. 5th to 6th cervical. Tapping elbow tendon produces extension of forearm. Posterior wrist. 6th to 8th cervical. Tapping tendons causes extension of hand	Outer side and front of forearm Back of hand, radial distribution.
7th cervical.	Triceps (long head). Extensors of wrist and fingers. Pronators of wrist. Flexors of wrist. Subscapular. Pectoralis (costal part). Latissimus dorsi. Teres major.	Anterior wrist. 7th to 8th cervical. Tapping anterior tendon causes flexion of wrist. Palmar. 7th cervical to 1st dorsal. Stroking palm causes closure of fingers.	Radial distribution in the hand. Median distribution in the palm, thumb, index, and one-half middle finger.
8th cervical.	Flexors of wrist and fingers. Intrinsic muscles of hand.		Ulnar area of hand, back and palm, inner side of forearm.
1st dorsal.	Extensors of thumb. Intrinsic hand muscles Thenar and hypothenar eminences.		Inner side of forearm and arm to axilla.
2d and 12th dorsal.	Muscles of back and abdomen. Erectores spinæ.	Epigastric. 4th to 7th dorsal. Tickling mam'ry region causes retraction of the epigastrium. Abdominal. 7th to 11th dorsal. Stroking side of abdomen causes retraction of belly.	Skin of chest and abdomen, in bands running around and downward corresponding to spinal nerves. Upper gluteal region
1st lumbar.	Ilio-psoas. Sartorius.	Cremasteric. 1st to 3d lumbar. Stroking inner thigh causes retraction of scrotum.	Skin over groin and front of scrotum.
2d lumbar.	Ilio-psoas. Sartorius. Flexors of knee (Remak). Quadriceps femoris.	Patella tendon. Striking tendon causes extension of leg.	Outer side of thigh.
3d lumbar.	Quadriceps femoris. Inner rotators of thigh. Abductors of thigh	Bladder centre. 2d to 4th lumbar	Front of thigh.
4th lumbar.	Abductors of thigh. Adductors of thigh. Flexors of knee (Ferrier). Tibialis anticus. Peroneus longus.	Rectal centre. 4th lumbar to 2d sacral. Gluteal. 4th to 5th lumbar. Stroking buttock causes dimpling in fold of buttock.	Inner side of thigh and leg to ankle Inner side of foot.
5th lumbar.	Outward rotators of thigh. Flexors of knee (Ferrier). Flexors of ankle. Peronei. Extensors of toes.	Achilles tendon. Over extension causes rapid flexion of ankle, called ankle clonus.	Outer side and back of foot and leg.
1st to 5th sacral.	Flexors of ankle. Long flexor of toes. Intrinsic muscles of foot.	Plantar. Tickling sole of foot causes flexion of toes and retraction of leg	Thigh, except inner side, gluteal region. Perineum and back of scrotum: anus.

It can readily be imagined that great variations will present themselves in the symptoms of syringomyelia, in accordance with the lateral extent of the cavity. Motor symptoms will be prominent only when the anterior cornua are invaded. But this is not infrequent; for, out of fifty-six cases analyzed by Bäumler, one or both anterior cornua were affected in twenty-four. Sensory disturbance characterized by loss of pain and temperature senses will occur when the posterior cornua are invaded. Thirty-two out of fifty-six cases presented such a lesion. Vasomotor and trophic symptoms are usually to be expected, since the central gray matter is almost always invaded. The cavity may extend so widely as to destroy, or, by its fluid contents, compress the white columns around the gray matter. In this case, if the lateral columns are affected in the upper part of the cord, symptoms of spastic paralysis will develop in one or both legs; and this was the case in one of Schültze's patients, while in one of Strümpell's spastic paraplegia was the diagnosis made. If the posterior columns are invaded, symptoms of ataxia will present themselves, as occurred in the case of Oppenheim cited, as well as in several others. In any case of spinal cord disease in which an anomalous combination of symptoms is present, the possibility of syringomyelia should not be overlooked.

With these facts regarding the clinical history of syringomyelia in mind, I ask your attention to the following case which has been under my observation since September, 1885, and in which, until recently, no satisfactory diagnosis had been made.

Case IX.—A feeble, poorly nourished woman, aged twenty-eight, of good family history, and without syphilis or previous illness, excepting an attack of cerebro-spinal meningitis at the age of six, first noticed the beginning of her present symptoms in 1879. Then she suffered from numbness and cold in her right hand, and soon found the hand growing weak and thin, and also quite insensitive to pain. These symptoms gradually extended up the arm and invaded the shoulder, and the muscles of the thorax and scapula, the skin of these parts becoming insensitive as the muscles atrophied. As the muscles became weak about the thorax, lateral deviation of the spinal column developed, the convexity being to the right. The hand assumed and retains the position of *main en griffe*, although the rigidity which she says was present during the first two years has now entirely passed away. The entire upper extremity has been wholly useless for four years. She has always noticed a trembling of the muscles. Within three months of the onset she had a bad burn on the arm, which was three months in healing, but which gave her no pain. In July, 1885, she had a peculiar attack. While standing quietly, she suddenly felt a numbness and tingling in the right arm, beginning at the elbow and extending up to the shoulder, neck, and face, with a feeling as though her face were drawn to the right side. This was attended by headache and vertigo, so that she felt faint, and had to sit down for a few minutes, and afterward felt quite weak for some days. She has suffered from no other symptoms, and no return of the attack.

Present condition.—The eyesight is good and optic disks normal, and there is no insufficiency of the ocular muscles. But the right pupil is smaller than the left, and the right eye is less widely opened, the upper lid falling slightly, and the eyeball being apparently slightly retracted. There is no facial or lingual paresis, but in the right half of the tongue there is a marked tremor. The sensation on the right side of the face, as regards temperature and pain, is less acute than on the left side, and cotton feels differently, as she expresses it, "rougher" than on the left side. Pulse and respiration are regular and normal, and she has never noticed polyuria. The right upper extremity, including the muscles of the thorax, scapula, and back, is completely paralyzed and very much atrophied, but does not exhibit the reaction of degeneration. The deltoid and palmar muscles are most affected, and their faradic excitability is diminished. Galvanic excitability is also diminished; *e. g.*, in deltoid KCC=4ma. AnCC=7ma. The trapezius is affected, and the supra-spinatus also, the latter being totally atrophied. The scaleni and splenii are not involved. The wall of the thorax is markedly thinned. The lateral deviation of the spine with elevation of the right shoulder is not due to caries, as it is not fixed, and there are no painful points. It is the result of muscular weakness in the spinal muscles. The arm hangs motionless, and all the muscles are relaxed; the only movement possible is a very slight flexion and extension at the elbow, the hand is in the claw position. Constant fibrillary tremor in the atrophied muscles is evident. No reflexes can be obtained in the arm. Sensation is very much impaired in the entire arm and upper half of the thorax. Temperature and pain sensations are suspended, but contact is perceived. Tactile sense, however, is somewhat less than on the other side; but muscular sense is not at all impaired. She feels pressure, and knows at once the position in which the fingers or forearm is placed. She can appreciate very slight differences of weight very accurately. The entire extremity is cold to the touch, cyanotic, and the skin is mottled, and various scars give evidence of previous ulcerations and burns, which do not appear to have given her much annoyance, probably because they were painless. The fingers do not appear to be smaller than those of the other hand, but the growth of the nails is impaired, and they are very brittle. She does not perspire on the right side. The left arm is not paralyzed, but is insensitive to heat. The right arm and forearm are each one and one-half inches less in circumference than the left one. The right breast is less full, fat, and firm than the left one. The right leg does not appear to be at all weak or atrophied, but the patellar tendon reflex is very much exaggerated, and ankle clonus is easily obtained. The sensation in the right leg differs slightly from that in the left leg, cold and heat being more acutely felt, and the cotton feeling, as in the face, rougher on that side. The only symptom in the left leg is a slight increase in the patellar tendon reflex. No other symptoms. Condition has been stationary for three years.

It will be noticed that the symptoms are those of progressive muscular atrophy in the entire right upper extremity, with implication of the sympathetic fibres from the cord destined to the eye, and with the added symptoms of a sensory and vasomotor and trophic character in the arm and thorax, and with slight analgesia of the face and tremor of the tongue.

The case is, therefore, more than one of progressive muscular atrophy. It is also more than one of anterior poliomyelitis, for in that disease, even when its onset is not acute, sensory symptoms are absent. Nor will the supposition of an unilateral cervical pachymeningitis, if such a thing is possible, explain the case, for there never has been pain or stiffness in the neck, and the rigid position assumed in that disease by the hand, in consequence of irritation of the motor nerves at the point of meningitis, has not been present. A unilateral tumor pressing upon the spinal nerves and cord may also be ruled out; for such a tumor should have given rise to distinct vertebral symptoms, and would hardly have come to a spontaneous standstill. It would also have involved the sensory nerves, suspending all their functions, not selecting some alone.

Amyotrophic lateral sclerosis might well be considered, in view of the fact of the increase of tendon reflexes in the right leg, and of the evident implication of the trigeminus and hypoglossus. But this disease is, so far as known, bilateral; it is progressive, and terminates fatally in three years, and the symptoms of spastic rigidity in the legs develop early. Nor will the supposition of a patch of disseminated sclerosis in the cord prove more satisfactory. For aside from the fact that there are no symptoms of other patches elsewhere, and a single patch would hardly occur alone, there is no sign of intentional tremor so characteristic of multiple sclerosis, and further, this disease does not produce such a complete paralysis. A unilateral myelitis being unknown, it becomes evident that every spinal disease, excepting an intramedullary tumor can be ruled out. But syringomyelia is the termination of an intermedullary glioma, and, hence, is the most probable diagnosis. Mention must be made of neuritis as a possible cause of the symptoms, since neuritis from toxic or infectious causes, or from injury, sometimes produces somewhat analogous symptoms. It may be stated, however, that, in neuritis, all sensations are equally affected, and there is no case on record where pain and temperature senses have been lost with preservation of touch and of the muscular sense. Furthermore, neuritis runs a rapid course. And, aside from this fact, the existence of increased tendon reflexes in the legs, and of some facial anæsthesia, and of sympathetic paralysis of the eye, necessitates the assumption of a spinal lesion.

I think, therefore, that by exclusion the diagnosis of syringomyelia may be reached in this case, especially as it corresponds quite closely to cases on record in which that condition has been found after death. And one further point seems to support this conclusion, viz., the occurrence of the peculiar attack of sudden unilateral paræsthesia with vertigo and headache. Such attacks are mentioned in the histories of several other cases, but no explanation has been offered. Is it possible

that they indicate a sudden breaking down of granular tissue with an extension of the cavity?

If the diagnosis of syringomyelia be accepted in this case, what is the location of the cavity? Since the symptoms began in the hand, it is probable that the glioma commenced in the eighth cervical and first dorsal segments of the spinal cord. As the entire muscular tissue of the extremity is now involved, the gray matter of the anterior horn must be affected as high as the fourth cervical segment and as low as the mid-dorsal region. Since the face is somewhat anæsthetic, we must suppose that a fissure extends upward through the posterior horn of the cord into the medulla, where it affects the ascending root of the fifth nerve. Such extension of the cavity into the medulla is not infrequent, it having been observed in one-third of the cases collected by Wichmann. As the symptoms so far have been unilateral, it is evident that the right half of the cord alone is involved.

As to the causes of syringomyelia very little is known. Trauma has been found to precede the development of the symptoms in several cases so immediately as to have been a factor in the etiology; and experimental injuries to the cord in dogs have been followed by a similar condition, as Eichholt and Naunyn observed. Over-exertion and cold have also been assigned as causes. That the disease has developed subsequently to the occurrence of fevers, viz., typhoid, intermittent, and rheumatic, and that it has affected syphilitic individuals can hardly be taken as indicative of a causal relation between the events.

Even less can be said regarding treatment. Nothing is known to affect the course of the disease, which may progress slowly, or come to a standstill, or terminate suddenly. The remission in the symptoms supposed by Wichmann to be diagnostic is not present in the majority of cases. When it does occur, it is not to be ascribed to any special line of treatment.

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HYSTERORRHAPHY.

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More than a year and a half has now passed since I prepared my paper for the Philadelphia Obstetrical Society, read upon November 4, 1886, describing a new operation for the correction of certain cases of malposed uteri, to which I gave the name "Hysterorrhaphy," the essential feature of the operation consisting in the suspension, or attachment, of the misplaced uterus by means of suture, through the cornua

or broad ligaments close to the uterus, in such a manner as to hold the fundus uteri permanently in anteposition. I there expressed my purpose to "formulate the rules for the adoption of a new operative procedure in the treatment of intractable cases of retroflexion, and of prolapsus uteri; the method proposed being applicable only to cases in which the local disease has rendered the patient's life miserable, and all ordinary means of relief have been found useless."

Since then a widened experience with the operation, and a careful study of a number of cases, have led me to modify some of the details, while the general principle of maintaining the uterus by means of sutures passed near the body, holding it in antefixation, remains the same. In an admirable paper by Dr. Sänger [*Centralblatt für Gynäkologie*, Nos. 2 and 3, 1888], entitled "Ueber operative Behandlung der Retroversio-flexio uteri," he clearly demonstrates the necessity of adopting some other procedure for the relief of many cases of retroverted and retroflexed uteri, than treatment by pessaries, inasmuch as the latter fails to relieve so large a number as twenty per cent. of all the cases.

He cites in this paper seven cases of his own operated upon by this method, two of which I published in my paper above referred to. [These were given me June 25, 1886, when visiting Dr. Sänger in Leipsic. Neither he nor I had then any idea that Olshausen was also interested in this subject.] In CASE I. [May 7, 1886], the retroflexion was overcome by combined action through the vagina and abdominal cavity, and the uterus the stitched to the lower part of the abdominal wound, by means of two silver ligatures passing through the right ligamentum latum, close to the cornua uteri. After recovery the uterus remained anteverted. In CASE II. [May 13, 1886] the patient, thirty-eight years old according to my paper, twenty-eight years old according to Sänger's recent account, had a retroflexion which had long been treated in vain by pessaries. At the time of the operation the uterus was stitched into the abdominal wound, as in the first case, and afterward remained anteverted.

The three following cases are related from notes kindly given to me while visiting Dr. Sänger in Leipsic, in the summer of 1887.

CASE III. *Ventro-fixatio uteri. Salpingo-oöphorectomy.*—Frl. Oh., twenty-six years old, a well-built woman, has for some years been under gynecological treatment for retroflexed uterus, associated with unusually severe and constant local disturbances, increasing at the time of menstruation, associated with hysteria and various neuroses. This was one of those rare cases in which no other basis for the serious local and general psychic disturbances could be found than a mobile retroflexed uterus moderately enlarged. Treatment by pessaries did not relieve, and the constant manipulation of the organs seemed to have led the patient into habits of masturbation. She was incapable of attending even to ordinary household duties, and at the time of menstruation remained in bed on account of the profuse loss of blood, menstrual pains, and the feeling of utter weakness and mental depression. Several gynecologists had

already proposed to relieve her difficulties by removal of the ovaries, or even to take out the entire uterus. To give the treatment by pessary a fair trial, Sänger put the patient under chloroform, anteposed the uterus bimanually, and inserted a Thomas pessary. In two days the uterus was found again in its old position, and further treatment with other forms continued unsuccessful.

In spite also of the protracted rest from all treatment which was given the patient, the psychic disturbances grew worse and worse, she became melancholic, and repeatedly attempted suicide, for which she was finally admitted to the insane clinic of the university. Her disturbance was here considered to be of an hysterical nature depending upon pelvic disease; accordingly, Sänger determined, in consultation with Professor Flechsig, to replace the uterus and attach it to the abdominal wall. The operation was performed December 4, 1886. *Three silkworm sutures were passed through the round ligaments and into the recti muscles* about three-quarters of an inch on either side of the incision. The sutures were not fastened until all had been passed. The uterus then lay close upon the base of the bladder, and so close to the abdominal wall that it was impossible for a knuckle of intestine to slip in between. During the attachment it was strongly bent ["feathered"], and was held in place with some exertion. *Tubes and ovaries were not removed*, as they were in a healthy condition. Pain was experienced for the first few days after operation, catheterization was necessary for eight days, although there was no tenesmus, and the patient left her bed in three weeks, when the pessary was removed, and the local difficulties had disappeared. A painless menstruation was established, lasting four days, with but little loss of blood, in marked contrast to the previous habit of one week. After three months the uterus was found to be normally anteverted, quite small, and quite movable in a vertical direction in spite of the lateral fixation. The patient's bodily condition has improved remarkably, and although her nervous system has not completely recovered, she no longer requires treatment for any pelvic difficulties whatever.

Case IV. *Epilepsy; retroflexed uterus; chronic oöphoritis. Operation: castration, and fixation of the uterus to the abdominal wall.*—Mrs. F., twenty-three years old, married seven years, sterile. Since her twelfth year she suffered from typical hereditary epileptic attacks, lasting two minutes at a time, followed by a coma lasting from two to three hours; these were increasing in frequency and violence, and were especially noticeable shortly before and after the menstrual period. She complained of constant pain in the lower part of her body, and in the sacral region of neuralgia, and very violent dysmenorrhœal pains. The family physician referred her to Sänger, under the belief that the relief of the pelvic difficulties would also influence favorably the epileptic attacks. A palliative treatment, continued for several weeks, was found to be useless. The uterus was retroflexed at an obtuse angle, but slightly movable, and both ovaries were in Douglas's cul-de-sac, swollen and very sensitive. Attempts to raise the uterine appendages failed. While the case seemed hopeless upon other grounds, the probabilities of relief through operation were good; accordingly, Sänger operated May 26, 1887, with the concurrence of Prof. Flechsig, into whose clinic the patient had first been brought. Some light adhesions were broken up, and the ovaries easily removed, and a few adhesions between uterus and rectum were separated. *Two silkworm sutures were used to attach the*

cornua uteri to the abdominal wound. After knotting the sutures, a space the breadth of a finger was noticed between uterus and bladder, into which knuckles of intestine might slip, on which account the sutures were cut, and the uterus again attached somewhat below the former point, so that it now lay more closely upon the bladder. The patient suffered afterward from cramping pains and restlessness, and for a few days after the operation with attacks of apathy and hysteria. The urine was drawn for a week. The incision healed favorably, with the exception of an abscess at the lower angle.

About eight weeks after the operation the uterus was found to be normally anteverted, and very small and movable, in spite of the antefixation. After three months the patient was dismissed in a greatly improved condition, free from all pelvic disease. The epileptic attacks had not improved; the gain, however, by means of operation, in the relief of the local difficulties and the improvement of the hysterical attacks, as well as the generally improved condition, was great.

CASE V. *Gonorrhœal infection; adherent, retroflexed uterus, pyosalpinx, and adhesive pelvic peritonitis. Operation: salpingo-oöphorectomy; attachment of the uterus to the abdominal wall.*—This patient was operated upon, after two years of palliative treatment, on the 12th of February, 1887. Ovaries and tubes of both right and left sides were removed after separating a number of intestinal adhesions, in which they lay, encapsulated. After freeing the attachments of the uterus to the rectum, the stumps at the cornua were drawn upward, and sutured one and one-half inches above the symphysis, and three-quarters of an inch from the line of incision to the abdominal wall by means of two silver sutures passing through the points of origin of the tubes and round ligaments, and carried deeply into the parietal muscles. Into an opening which remained between the uterus and bladder a part of the descending colon became fastened, and it was necessary to cut the sutures of the left side and at the left cornu uteri and reattach them in such a way as to diminish the opening. The patient had no urinal difficulties whatever; passing water freely from the first day. The incision healed completely and perfectly, and at the last examination, five months after the operation, the uterus was found to be anteverted, quite small, and movable. Her appearance was blooming, and she complained of no difficulties whatever. The result was in this case faultless.

In addition to these cases just cited, Sänger has, since I last saw him, operated upon two others.

CASE VI.—(November 8, 1887.) A case similar to the last, suffering from gonorrhœal infection, with disease of both appendages, and an adherent retroflexed uterus. The *uterus was fastened by means of two silver sutures,* close over the bladder, *to the anterior abdominal wall.* The case recovered without any unfavorable symptoms, having no trouble with her bladder, and was dismissed twenty days after the operation well, with a uterus anteflexed, small, not sensitive, and still firmly fixed to the anterior abdominal wall.

CASE VII. was a woman upon whom he had already operated, shortening the round ligaments. On the left side the tissue removed proved to be a portion of the cremaster muscle instead of the round ligament, while on the right a piece three inches long was drawn out and cut off.

Inasmuch as this operation failed, and the patient insisted so earnestly upon securing some relief from her sufferings, which rendered her incapable of work, after a number of trials with various pessaries, Sänger determined upon the abdominal fixation of the uterus. Owing to the great thinness of the abdominal walls, and the readiness with which the uterus could be handled by combined manipulation, the operation promised to be one of comparative simplicity, but in this it was deceiving, as the fundus uteri was covered with intestines, and the incision had to be lengthened to about four inches, to keep the intestines away from the uterus, by means of a napkin and two sponges.

Three silkworm sutures were passed through the round ligaments, and the broad ligaments close to the sides of the uterus, *and the organ thus attached to the anterior abdominal wall.* The case recovered without any unfavorable reaction. The pessary which she had been wearing was removed two days before dismissal. The uterus had already grown very small, and quite movable. The fundus uteri could be seen moving through the abdominal wall. All of her difficulties had completely disappeared.

Sänger remarks, in conclusion, that all of his seven cases of ventrofixatio uteri retroflexi are cured. In the third and seventh of these operations, the procedure was one of hysterorrhaphy pure and simple, while, in the others, hysterorrhaphy was performed coincidently with the removal of diseased appendages.

The four following cases I have received from Professor Paul Zweifel, of Leipsic, through the kindness of Dr. Döderlein. The analysis speaks for itself.

CASES OF PROF. ZWEIFEL, OF LEIPSIC.

No.	Reason for operation	Nature of operation.	Sutures.	Height of attachment.	Appendages.	Result.
VIII. Sch.	Retroflexed uterus; difficulties caused by pessaries	Laparotomy and hysterorrhaphy.	Two, of silkworm gut	Immediately over and on both sides of the symphysis.	Not removed.	Manifestly cured only three weeks after the operation
IX. U.	Retroflexed uterus; perioöphoritis	Laparotomy and hysterorrhaphy	Two, of plaited silk.	Immediately over and on both sides of the symphysis.	Both ovaries and tubes removed, and stumps fastened by ligatures to the abdominal wall.	Entirely relieved of all difficulties.
X. H	Adherent retroflexed uterus.	Laparotomy and hysterorrhaphy.	Two, of silkworm gut.	Immediately over and on both sides of the symphysis	Nothing removed.	Entirely relieved of all difficulties.
XI. V	Retroflexed uterus and hysteria.	Laparotomy and hysterorrhaphy.	Two, of silkworm gut	Immediately over and on both sides of the symphysis	Nothing removed.	Patient insane. Recovery from the operation No pelvic difficulties, but many general complaints.

Dr. Staude, of Hamburg, has given me the record of the following case, unpublished, in which he performed the operation of hysterorrhaphy:

CASE XII.—The patient, a married woman, forty-one years of age, had had one child sixteen years before. She came to Dr. Staude complaining of pain in the left side of the pelvis and in the ovarian region, and of much distress on sitting down. Examination revealed a uterus fixed in retroflexion. It was impossible to repose the uterus after putting the patient under an anæsthetic. As the woman was incapable of pursuing her calling, and Dr. Staude could not relieve her in any other way, he proposed releasing the adhesions by an abdominal section, and curing the retroflexion at the same time, by attaching the uterus to the abdominal wall. This operation was performed on the 12th of April, 1885, the proposition being, first, *to release the uterus, and then*, after extirpating both ovaries, *to attach the uterus to the anterior abdominal wall* by means of the stumps of the broad ligaments. The separation of the attached retroflexed uterus, after a carefully made incision, was not difficult. The left ovary, free and normally movable, was removed, and the left broad ligament attached, by means of the catgut ligatures binding the stump of the ovary, to the peritoneum on the left of the line of incision. The right ovary, on account of its firm adhesions in the pelvis, was so fixed that it could not be separated. This had evidently formed the chief obstruction to the attempt at reposing the uterus. Also upon raising the uterus a small fibroid tumor was found at the junction of the body with the cervix. After thus fixing the uterus to the abdominal wall, and carefully replacing the intestines, the incision was closed, and the patient made a smooth recovery. Result, from a half to one year after the operation the uterus had remained in the position given by the operation. The pressure difficulties on sitting had completely disappeared, while the pains which were complained of, in the left lower abdominal region, still continued. An examination revealed on the left side at the painful spot no disease whatever, while, on the right side, there were marked changes, and no pain at all was complained of.

Dr. Brennecke, of Magdeburg, has given me for publication these cases, in which he performed hysterorrhaphy successfully.

CASE XIII.—In 1883 he removed a large ovarian tumor from the right side of a woman aged seventy-two, suffering at the same time from complete prolapsus uteri, occasioned by the large cyst which extended deep into the pelvis. *The stump of the right horn of the uterus was stitched into the abdominal wound for the purpose of curing the prolapsus.* During her recovery the patient was without any other disturbance than a suppuration at the lower angle of the incision. This continued to discharge for one year, after which the case remained permanently and perfectly well. The sutures used were silk prepared in iodoform.

CASE XIV. was a patient about thirty-six years of age, operated upon in the winter of 1885–86. She had a small dermoid cyst the size of a child's head in the left ovary, and suffered at the same time from prolapsus. The removal was very difficult. *Both uterine cornua were sutured to the peritoneum of the abdominal wall*, at the sides of the lower part of the incision; she had some difficulty in urinating for a

short time. After a few weeks the uterus fell again, and after a few months was in as bad a condition as ever. The stump was attached directly to the abdominal wall by two sutures on one side; and on the other side two sutures encircled the round ligament. The abdominal wall was entered about a fifth of an inch in depth.

These cases Dr. Brennecke detailed to me in conversation from memory.

The two following unpublished cases of hysterorrhaphy, performed upon the retroflexed uterus, were given me by Prof. Werth, of Kiel.

Case XV.—Patient, aged forty-one, had had five children. She suffered from retroflexed uterus and constant hemorrhages, and had had marked neurasthenia for eighteen months after a probable abortion. Menstruation was regular but profuse. For ten years past she had suffered from a descensus, for which she wore a ring pessary; this she had changed, two years previously, to a bandage with a uterine stem pessary. The retroversion was extreme, the cervix lying close behind the symphysis, the os uteri being turned completely upward, the vaginal walls were relaxed, but not prolapsed. The patient was in a wretched condition, anæmic and bleeding, and could not wait long for relief by pessaries. Operation was undertaken with the intention of removing the ovaries to check hemorrhage. *The uterus was raised and attached by the stumps of the ligaments to the abdominal wall*, just above the bladder on both sides by means of several stitches, taking especial care to sew it flat against the wall to keep out knuckles of intestine. The sutures were of silk, interrupted and dropped. After the operation, which was upon February 14, 1887, the patient suffered from no difficulty excepting a little flatulence.

Feb. 17. Passed water herself; very slight dysuria.

21st. Retention of urine.

22d. Pain in the bladder and burning in the urethra. Clear urine drawn, urethra found strongly contracted.

27th. For a few days involuntary loss of a few drops of urine.

On March 2d, examination made, and uterus found *anteflexed* to the right and the fundus close behind the symphysis, not sensitive to pressure as before. There was nothing abnormal in the surrounding parts. After rising, slight temporary difficulty with her urine. In May a report was brought that she was "doing very well."

Case XVI. was a woman who had borne a child fifteen years before. On February 10, 1884, Prof. Werth removed a dermoid cyst of the right ovary. The uterine body was somewhat enlarged, and adherent to the pelvis in a state of sharp-angled retroflexion. Adhesions which attached the uterus to the posterior walls of Douglas's pouch were separated, and *the uterus brought into anteposition and attached to the peritoneum of the bladder by silk sutures*—probably two. The first night after the operation the patient suffered from flatulence, but no urinary difficulty, passing water herself.

On the 15th she complained of cutting pains in the right hypogastric region and over the symphysis.

On the 3d of March examination revealed the uterus anteverted, and the fundus flattened close under the scar in the abdomen. The cervix was found far back in the pelvis. The note of March 27th states that her condition is good.

In addition to the two cases operated upon by Lawson Tait, and detailed in my first paper upon this subject, I add another quoted from Dr. Senn (*Four Months Among the Surgeons of Europe*, p. 51). After removal of both ovaries and tubes to cure the prolapsus from which the patient was suffering, "*the uterus was stitched to the inner surface of the abdominal wound.*" I am not able to make any statement as to the exact procedure or the result in this case.

In the *Pittsburg Med. Review*, vol. i., No. II., p. 280, Dr. J. R. Weist tabulates a case (No. 190) in which he attached the stump of an ovarian tumor to the abdominal wound to cure a coexisting procidentia.

Fig. 1 shows the condition of a case recently operated upon by the writer, of which fuller details will be published later. The very large fundus lies retroflexed at an acute angle on the cervix, to which it is bound by numerous adhesions. The left ovary, much enlarged, lies below this, and to this it is also attached by adhesions.

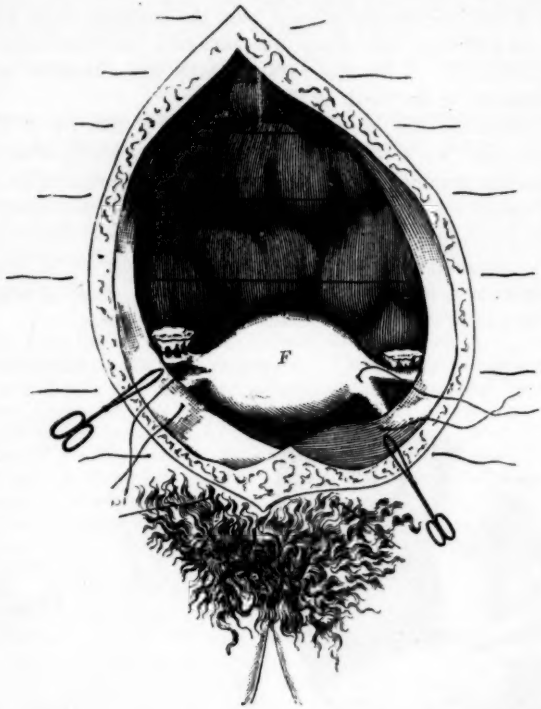
FIG. 2 FIG. 1

Fig. 2 shows the method of bringing the round ligament on the right side into view for the passage of the suspensory suture. The adhesions have been separated, the right and left ovaries and tubes tied off, and the fundus (*F*) raised.

In Fig. 3 the fundus (*F*) is seen as it lies in position preparatory to the tying up the two suspensory sutures (*S S*). The artery forceps are seen lying on either side everting the peritoneum, through which each suture can be thus seen to pass. These sutures are next tied tightly and cut short and let go. The row of sutures above are then drawn up and the whole wound thus closed. It will be observed that the uterus is thus

left close above the symphysis, and this was accomplished in this case without any effort at traction.

FIG. 3.



The name "hysterorrhaphy" which I adopted at the time of preparing the first paper in the Spring of 1886, is compounded of ὑστερα, uterus, and ῥαφη, a suturing, and signifies either simple plastic suture of the uterus, "rhaphe" being used as in *perineorrhaphy*, or else suturing of the uterus to something, when it is used as in *nephrorrhaphy*, fixation by suture of the floating kidney. In this latter sense I have used it. Plastic suture of the uterus alone is an operation not yet devised; when the uterus has been sutured, this has formed but a step in the course of another operation, and is not properly entitled to receive a distinctive name. "Hysterorrhaphy" might be claimed as better adapted to describe the operation upon the uterus closing the rupture occurring intrapartum, but the preliminary steps of opening the abdomen, and removing the fœtus, secundines, and blood, are far more serious than the simple suture of the tear, and the title should, therefore, be longer, and more completely descriptive. I prefer this term to gastro-hystero-

synaphy, on account of the claims of euphemism, and I prefer it to longer descriptive Latin names, as more in accordance with our present customs of nomenclature.

Hysterorrhaphy is indicated,

First, in cases of the adherent retroflexed uterus, in which the patient's sufferings arise from the malposition, cases which cannot otherwise be relieved, and in which there is a fair prospect of relief by elevating and securing the permanent anteposition of the uterus.

Second, it should be adopted in all cases of simple retroflexion where treatment through the vagina fails to relieve, and there is a reasonable hope that with the cure of the retroflexion the patient's sufferings will disappear.

Third, the propriety of proposition second being granted, it is, *à fortiori*, urgent, to insure the permanent replacement of a malposed uterus, coincidently with any other abdominal operation.

Fourth, in cases of prolapsus which cannot be cured by operation or treatment per vaginam, under the usual restrictions as to age, health, etc., hysterorrhaphy may be resorted to.

Judged by its present record, its no per cent. mortality, hysterorrhaphy is less dangerous, and more uniformly successful than the operation of shortening the round ligaments pulled out through the inguinal canal. In cases of adherent retroflexed uterus, there can be no rivalry between the methods, unless the operator will be willing to complicate his procedure, by making an abdominal incision, and after freeing the adhesions, making two additional lateral incisions to shorten the ligaments. In prolapsus the lengthening of the round ligaments is clearly secondary to the falling of the uterus, and a result of the traction exerted by the weight of the body. The uterus, therefore, does not fall in consequence of the lengthening of the round ligaments, as must be claimed if we would support the assertion that the operation is rational because it restores the natural condition of the parts. The round ligaments are so attenuated in many of these cases that they are found with the utmost difficulty, or not at all; and even if at one time they did exert a strong influence in supporting the uterus, they are in their present condition incapable of doing more than feebly assisting in this function. I have further, already pointed out the increasing mechanical disadvantage under which the round ligaments labor as the uterus is lifted higher up and nearer to the plane of the canals in which traction is made; after it has reached a certain point, still below this level, the utmost efforts at traction not succeeding in producing any greater elevation. No operative procedure for prolapsus has yet been devised which will restore the parts to their *primitive integrity*, and all attempts are but more or less efficient *substitutes* for the natural supports. In some cases of prolapsus where the tissues still retain sufficient regenerative power, treatment from below, narrowing the vaginal

outlet, holding the cervix back toward the sacrum, often conjoined with amputation of an enlarged or elongated cervix, will succeed in permanently curing the patient: but where these methods have not succeeded, hysterorrhaphy, being a procedure mechanically more efficient, and less dangerous than shortening of the round ligaments, will find its field and cure the prolapsus.

In some cases of simple retroflexion accompanied by disease of the ovaries and tubes, the displacement will be relieved by taking up as much of the slack in the broad ligaments as possible, when tying off the tubes and ovaries. It is necessary in such a case to apply the ligature very tightly and with extreme care, on account of the danger of hemorrhage from retraction of the tissues in the stump, to which the additional tension makes it liable. This method cannot often be relied upon, as the retroflexion readily recurs, for it is evident that where the uterus is only fixed by an axis passing through its transverse plane, visceral pressure on the fundus, acting with the free mobility in the sagittal plane, will readily rotate it backward, the cervix turning in the opposite direction as the fundus rolls over, without, necessarily, in the least affecting the tension on the lateral ligaments. This mechanism of the reproduction of a retroflexion I have actually observed. It becomes then evident, that as the rotation of the uterus in retroflexion is always in the sagittal plane, a slight acting force in this plane will effect more than a much greater force working in the coronal plane, that is, its transverse axis. *Fixation in the sagittal plane is attained by hysterorrhaphy.*

The normal condition of the body of the uterus is one of mobile anteflexion, resting on the upper and posterior surface of the bladder, rising and falling with the alternate emptying and distention of that organ. This position was given in Prof. Werth's second case, cited above, and from this successful case I formulate a rule for the performance of hysterorrhaphy where the fundus uteri is not large and heavy. A single silkworm gut suture should be passed through or around the round ligaments at the uterine insertion on either side, and through the peritoneal coat of the bladder at the point on which the uterus naturally rests, and tied. If care is taken not to grasp the bladder too much from the sides, there need be no fear of tormina as the bladder fills. This simple suture is not any more likely to prove a source of irritation to the bladder than sutures so often passed after its rupture. The relation of the uterine and vesical surfaces thus effected is intimate, exactly imitating the natural position of the uterus, and is the ideal of the operation of hysterorrhaphy.

Another of the great factors in the reproduction of retro-displacement is relaxation of the utero-sacral ligaments, allowing the lower part of the uterus to drop down toward the vaginal outlet, and thus, without any necessary displacement of the fundus, completely changing the direction

of the uterine axis from ante- to retro-direction. This disadvantage must be met in any operative procedure by additional measures applied per vaginam tending to keep the cervix well back in the pelvis.

This might also be attained by an intraperitoneal suture, shortening the utero-sacral ligaments. I do not believe that these ligaments can be satisfactorily shortened from the vagina as suggested by Sänger, but rather by a plan which I have proposed, of passing a suture on either side of the rectum down in Douglas's pouch, from within outward, bridging over the laxity, entering the needle deep into the cervix at the point of their attachment on either side, and thus by two sutures, tied tight, the slack is taken up and the cervix held well back in place.

While the above *natural* method of attaching the uterus to the bladder will suffice for the simple cases, the method as previously proposed will be necessary in cases of prolapsus and in retroflexion with an enlarged fundus, or retroflexion with descensus.

In cases of adhesions, after releasing all attachments which bind the uterus down, and checking hemorrhage, the intestines should be kept out of the way by means of one or more large flat sponges, or, better still, a properly disinfected piece of cheese-cloth, when the uterus is to be brought up, and two or three sutures of silkworm or silver wire passed one below the other through each round ligament near its uterine origin, and deeply into the tissues of the abdominal wall just above the symphysis pubis on either side of the incision, and at a distance from it about equal to half the breadth of the uterus. These sutures are left long and held in the grasp with forceps until all are passed, when they are to be tied, as recommended by Sänger, who has also shown the necessity of employing a number of sutures. When the sutures are thus tied the uterus will be held snugly against the abdominal wall. That the function of the bladder is not thus seriously interfered with, is shown by the histories given, the disturbance being but temporary at the utmost. This objection I had considered previous to operating, and answered by clinical observations, when, upon making bimanual examinations, I have frequently found the bladder lying entirely to one or other side of the median line.

It is not claimed that hysterorrhaphy substitutes the natural for an unnatural position of the uterus, but that it gives the best possible equivalent, and one which, in so far as results are concerned, is often as satisfactory as the natural position. By this means prolapsus is cured, retroflexion is straightened out, and the vessels which have long been compressed and twisted are brought up to a health level, and the uterus is drained of its accumulated débris. That these remarkable results are brought about in a surprisingly short space of time, is shown by the rapid diminution in the size of the uterus in Sänger's cases. Although

the new position thus assumed does not possess the mechanical advantages of the healthy organ when all ordinary exertions tend to increase rather than diminish the power of resisting prolapsus or backward displacement, it yet possesses an advantage over the organ in any other than the normal position. In the new position thus given the uterus, pressure from within cannot act upon its anterior surface, and forces acting vertically downward toward the pelvic outlet are reflected off from the inclined plane of the posterior surfaces, affecting but a small area on top of the fundus; it is, therefore, but little influenced by many forces ordinarily concerned in reproducing displacement. The only disadvantage to which it is now subject, is its own weight, increased by its vis inertiæ and succussion. This is controlled by an adequate number of sutures, to be increased according to the weight to be suspended.

Thus far no trouble has been experienced from, nor has any pain been occasioned by the traction necessary to bring the uterus into this position and retain it there. Dr. C. C. Lee, of New York, one of the first to appreciate a possible future for this operation, has, in conversation with the author and by letter, insisted in particular that its widest scope is in cases of retroflexion with adhesion.

Dr. Polk, of New York, proposed and tried, in two cases of retroflexion, after opening the abdomen and rectifying the flexion, to support the uterus by means of a drainage tube passing from the lower angle of the incision into Douglas's pouch. A similar method was also practised by Dr. Klotz, as announced in the *Proceedings of the Gynecological Society*, in Dresden, of October 6, 1887. In this case, as reported by Dr. Klotz, after a complete and careful release of all adhesions of the ovaries and the tubes, one tube of an ovarian pedicle was stitched into the abdominal incision, and the uterus further supported by a drainage tube one and a half centimetres in diameter, reaching down into Douglas's pouch, where it was allowed to remain for from three to four weeks. The report is incomplete, wanting a more exact description of the methods employed. I cannot anticipate, nor does Dr. Polk himself seem to look for, any wide field of utility for this apparently simple method of support (*American Journal of Obstetrics*, October, 1887, page 1046). The ease with which the uterus, propelled by intestinal movements, assisted by the dorsal position of the patient, can slip around such a prop is but too evident; and in case of success, if the appendages had been removed, I should rather attribute the success to coincident premeditated shortening of the broad ligaments in removing the ovaries and tubes. Another serious disadvantage is the length of time necessary to retain the prop *in situ*, to insure a permanent result. If this method is to receive further trial, I would recommend, instead of the drainage tube, the use of one or two of the glass stirring rods found at chemists,

which could be passed between stitches, and not in any way interfering with the proper closure, and careful suturing of the abdominal wound. Under the usual antiseptic precaution these could be left in place a long time.

In conclusion, hysterorrhaphy is only to be practised in a limited number of carefully selected cases, and, in the hands of the skilful abdominal surgeon, it will be found to be a safe procedure. It is not to be recommended in all cases of obstinate retroflexion, whether with or without adhesions. I have at present five patients under treatment, between thirty-five and forty-five years of age, who have suffered from retroflexion since girlhood. They are sterile, and for that reason come to me for treatment; the vagina is long, the uterus small, generally adherent, retroflexed; they have general pelvic tenderness, of which they complain almost constantly, subject to exacerbation at the menstrual period. In these cases, whether congenital or acquired, the condition has become a habit, and I do not believe that the simple correction of the flexion will either relieve them of their pains or cure the sterility, and I have not in any such case advised the operation. I would also hesitate very much before advising its performance in a very obese patient.

If, in time, this method shall prove acceptable, reflecting credit upon its originators, much is certainly due to Koeberlé, who, in a single case, opened the abdomen, corrected the flexion, and sutured the stumps of the appendages into the abdominal wound. Credit is due to Olshausen and myself in independently originating and recognizing the importance of the procedure as one widely applicable; and to Sänger, who has been the first to take hold of the subject and, by careful analysis, and many practical observations, place it upon the footing where it will surely command the attention of gynecologists throughout the world.

February 15, 1888.

PROLAPSE OF THE INVERTED LOWER PORTION OF THE RIGHT URETER THROUGH THE URETHRA IN A CHILD TWO WEEKS OLD.

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The following interesting case came under my observation in the surgical department of the German Dispensary of the City of New York, in the service of Dr. Ernst Schottky, who courteously invited my par-

ticipation in the observation and treatment of the same, and ultimately submitted its publication to me.

Baby S., female, two weeks old, nursed by mother. Family history good. The mother states that her child had had diarrhœa since birth, on an average eight to ten evacuations daily, sometimes accompanied by tenesmus, but without a trace of blood. The passage of urine was not accompanied by any symptoms to attract attention. The child was often restless, and slept but little; the home remedies, to check the diarrhœa, administered by the mother proved ineffectual.

On November 6, 1886, the infant appeared extremely restless and refused to take the breast. Toward evening a severe prolonged fit of crying left it exhausted and pale in its mother's lap.

The next inspection of the child's genitals for diapering revealed the presence of a tumor or swelling protruding from the vulva, and in this condition it was presented at the Dispensary the following day.

A preliminary examination revealed a soft, bluish red tumor, pyriform in shape, the size of a walnut, protruding from the vulva.

Palpation of the protruding part gave the impression of a smoothly lined sac. Careful digital examination per rectum elicited nothing abnormal. Traction on the swelling in an upward direction showed a very distinct *introitus vaginæ*. The hymen was absent and the vaginal canal large enough to admit of the introduction of the oiled index finger and palpation of the *portio vaginalis uteri*.

The tumor was located midway between the symphysis pubis and the introitus vaginæ, and could be pressed well into the vagina, thus disappearing from sight, but remaining perfectly distinct to the touch and irreducible by pressure, the possibility of a diagnosis of prolapse of the anterior vaginal wall being thereby excluded. The urethral orifice was not in view, while its site was occupied by an annular tumefaction from the centre of which the pedicle of the tumor seemed to take its origin.

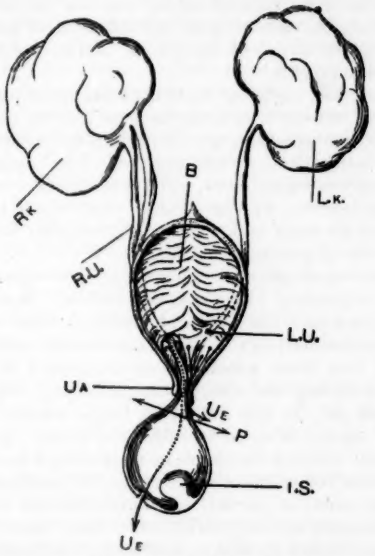
This condition, in view of several published cases of prolapse or inversion of the bladder, naturally led to the assumption that the case in question was of such a nature, viz., prolapse of the whole or a part of the bladder through the urethra. A close inspection of the tumor was made and a lateral opening in its right side was found, which admitted the passage of a probe. (See illustration.)

Immediate reduction of the prolapse was decided upon. After thoroughly disinfecting the genital region, the child was chloroformed and we succeeded without much difficulty in reducing the prolapsed part by means of a curved silver catheter, whereupon the enormously dilated urethral orifice came into view. The bladder was now washed with a disinfecting solution of potassium permanganate and the vagina packed with iodoform gauze to prevent a possible relapse, and the child was sent home with a warning to the mother to guard against overfeeding.

Nov. 8. The mother reports extreme restlessness of the child with no improvement in the character and frequency of stools, they being thin, yellow, and containing considerable mucus. The child also vomited after each nursing, which was probably due to the anæsthetic (chloroform).

The urine was reported to be clear and was passed in jets spouting in an anterior and posterior direction, the function of the sphincter vesicæ

being evidently unimpaired. Facies indicative of slight collapse. Abdomen gave evidence of tympanites and tenderness on pressure. Temperature in rectum 102° F. (peritonitis).



Showing the anatomical relation of the parts.

R. K. Right kidney. L. K. Left kidney. R. U. Right ureter (double). L. U. Left ureter. B. Bladder. UA. Urethra. P. Prolapsed right ureter. I. S. Inflammatory swelling (tumor). UE. Urine.

Inspection revealed the prolapsed part again protruding in its original form, its surface being darker and spotted with a grayish exudation. Severe crying and straining on the part of the little patient necessitated repetition of the narcosis (chloroform), causing considerable delay, and after removal of the vaginal tampon and application of iodoform to the prolapsed part, a second reduction was successfully managed. The vagina was again firmly packed to the introitus, and the parts anointed with iodoform vaseline. A cold compress was ordered to the abdomen. As nourishment barley-water, whiskey in water, occasionally the breast. Medication: bismuth and opium.

9th. During the past twenty-four hours the child had rested quietly. Tympanites was less marked. Temperature 101½° F. Expression and general appearance better. No recurrence of prolapse. Urine clear and passed at regular intervals. One thin evacuation. Vaseline and iodoform reapplied, and the parent advised to continue the treatment of the day previous.

10th. The infant had two normal evacuations, took the breast readily, but passed cloudy and bad smelling urine, and appeared restless after each application of the cold compress. Temperature 101½° F. Tym-

panites moderate, expression again denoting collapse. The prolapse was again visible and appeared discolored. Chloroform was again administered, the stage of relaxation setting in more rapidly than before, narcosis was deeper and lasted longer. The tampon was removed, and the vagina and bladder irrigated with potassium permanganate solution, fresh tampons were introduced, and continuance of previous treatment advised. Instead of the cold compress, warm, moist bandages were ordered over the abdomen.

11*th*. Diarrhœa had again set in, amounting to seven greenish evacuations, with much tenesmus and restlessness. Urine no longer offensive, and general condition satisfactory. No prolapse visible. During examination patient had a thin, yellow passage. The bladder was irrigated as usual, the fluid returning clear. Rigorous dietary restrictions, which had been left unobserved by the mother, were again insisted upon, and frequent doses of bismuth and opium advised, also local treatment by means of enemata of lukewarm water.

12*th*. Diarrhœa same as on previous day. The orders as to strict diet had been again neglected. Prolapse not visible. Removal of tampons, irrigation of vagina and bladder, and reintroduction of fresh tampons were possible without narcosis. The mother's statement that the urine came clear and free from smell was corroborated by the spontaneous passage of urine during the above manipulations, but previous to this the urine washed out by the irrigation liquid appeared dirty and had an ammoniacal odor. Strict diet, nitrate of silver, opium, gum arabic, and whiskey were ordered for the next twenty-four hours.

13*th*. Inspection revealing a recurrence of prolapse, the parts were now subjected to another careful examination, as a result of which we were enabled to come to the positive conclusion that it was not simply a vesical prolapse *in toto* we had to deal with, but presumably a prolapse of a part or diverticulum of the bladder, for the following reasons:

(1) Careful manipulation resulted in the successful passage of a catheter between the tumor and the annular tumefaction surrounding its base (representing the urethral orifice) into the bladder beyond.

(2) It was also observed that straining efforts on the part of the child forced urine through the same passage from within outward.

(3) Rotation and forward movement of the probe around the neck or pedicle of the tumor further enabled us to locate a right lateral insertion into the base of the bladder.

14*th*. The surface of the sac showed a slough in the immediate neighborhood of the opening before recognized, through which a probe when introduced descended to the same depth as when passed into the bladder proper. Furthermore, the opening revealed the existence of a small, hard tumor, about the size of a pea, within the cavity of the prolapsed sac. The nature of this tumor we were unable to determine. Believing the prolapsed part to be a diverticulum, and having found it to be irreducible, we agreed to remove it.

Bladder, diverticulum, and vagina were again irrigated with potassium permanganate solution. In the meantime tannic acid had been administered internally to check the diarrhœa, and as a result the child now had one or two normal evacuations daily. The temperature alternated, being at times normal, subnormal, or elevated, but never exceeding 102° F. The child urinated well, did not vomit, nursed fairly, but slept insufficiently, and had become much emaciated.

Two days previous to the operation the opening in the prolapsed sac was noticed to afford exit to a purulent, offensive discharge. A flow of urine was never seen to take place from the prolapsed portion.

The sac was cut away on the twelfth day after presentation at the dispensary, under chloroform, which the child bore very badly. The diverticulum was put upon the stretch, thoroughly ligated, and as much as possible removed by scissors. The child died in twelve hours.

Post-mortem Appearances.—*Abdominal cavity:* Stomach and intestines much inflated, but empty and not congested. Their removal exposed to view a bluish, fluctuating mass about the size of a hen's egg, representing the right kidney, also a mass similar in appearance but smaller, representing the left kidney. Both ureters dilated. The right ureter was double, with double insertion into the hilus, both branches converging in their downward course, and terminating by a single opening in the bladder.

The bladder was found empty, no hemorrhage having taken place. The point of insertion of the amputated sac was plainly visible and corresponded to the site of the opening of the right ureter in the normal state. It appears, from the description, that the probe introduced into the supposed diverticulum must have entered the dilated right ureter.

The right kidney had undergone cystic degeneration, and contained sero-purulent fluid.

The prolapsed sac, which had been removed by operation, was continuous with the mucous lining of the right ureter, and was, in fact, a prolapse of the inverted lower third of the right ureter into the bladder and through the urethra.

The whole urino-genital apparatus was removed for preservation and subsequent microscopic examination.

At the time of the autopsy the microscopic appearance of the kidneys suggested sarcomatous degeneration. The lobulated appearance was noticeable in both kidneys, but more so in the left one. On section of the right kidney several cavities filled with pus were detected, the largest being the size of a cherry, the smallest the size of a pea.

A section of the left kidney showed no abscesses, but marked thickening of the cortical substance with pale red nodules interspersed, which, to the touch, proved to be harder than the surrounding portions. Pelvis of kidney wider than normal, otherwise unchanged.

Sections for microscopic examination were made from the prolapsed mucosa of the right ureter and from the cortical and pyramidal parts of both kidneys.

Right kidney: Inflammatory changes were most marked in the neighborhood of the abscesses, gradually fading toward portions little attacked. The epithelia of well-preserved lobules exhibited coarse granulation. In the intensely invaded portion only the tufts could be made out. When tufts and capsules were visible, the space between them was partly or completely filled with inflammatory corpuscles. A breaking down of capillary loops and interstitial tissue was well marked in numerous places. In some places remnants of both convoluted and straight tubules were recognizable by their epithelia, which were comparatively little altered. In many places, however, the epithelia appeared so broken that the whole tissue looked uniformly crowded with inflammatory corpuscles, and but faint traces of former tubular epithelia could be made out. In the pyramidal portion of the kidney only slight inflammatory changes were present.

Left kidney: In the left kidney the nodules above mentioned were the main objects of microscopical research, owing to the suspicion upon examination with the naked eye that possibly these nodules were of a sarcomatous nature. A careful analysis of their minute structure disproved this assumption. In fact, the nodules were of the same nature as the diffused infiltration of the right kidney, viz., interstitial nephritis tending toward suppuration, which had not yet taken place. The latter changes were most conspicuous in the epithelia of the narrow and loop-tubules, whose calibre appeared to be lost to a great extent. The interstitial connective tissue was infiltrated to a varying extent, and the capillary bloodvessels therein appeared rather compressed or destroyed. The general appearance was that of infiltration immediately preceding suppuration. The prolapsed part of the ureter showed at the site of the sloughed small tumor nothing but marked inflammatory infiltration of the mucosa and submucous connective tissue.

In summing up, we may positively state that the pathological condition in both kidneys was strictly inflammatory.

REMARKS.—From a careful review of the foregoing account of this unique case it would appear that, owing to the formation of a warty or *papillomatous* small growth in the right ureter near its vesical insertion, a partial or complete occlusion of the ureter took place, in consequence of which the small tumor was pressed into the bladder, and finally through the urethra, carrying with it or dragging along the inverted lower third of the ureter, which presented in the form of the sac. The sac was supposed to be a diverticulum of the bladder, owing to the fact that at no time was it possible to insert a probe into the opening in this sac to a greater depth than when inserted at the side of the sac into the bladder proper, and at no time was a discharge of urine noticed to take place from this sac.

The inflammatory changes in the right, and those also in the left kidney, were probably due to infection taking place through the exposed and sloughed membrane. An explanation for the persistent diarrhœa is of minor importance, and is therefore not attempted.

As far as our reading goes, a similar case has never been reported.

ON THE STERILIZATION OF MILK AND FOODS FOR INFANTS.[1]

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DURING last summer's work as District Physician of the Boston Dispensary, my attention was called, by the severity and prevalence of the trouble, to the summer diarrhœas of infants. The disease was quite

[1] The work for this paper was done in the bacteriological laboratory of the Harvard Medical School, for the freedom of which I am much indebted.

prevalent, and in my cases severe, as the milder ones were all treated as out-patients. In most cases it had existed for about a week, and the infant was already collapsed by the time of my first visit. The skin would be found cold, the limbs were blue, the fontanelles sunken, eyes the same, the child either indifferent or curled up and whining. The pulse would be weak, small, and rapid, and the temperature, in the rectum, over 100° F., often higher; convulsions were rare. The bowels were tender and in most of the cases diarrhœa existed; a few, however, were constipated. The tendency of all discharges was to a green color and much mucus. In short, the clinical picture was that with which all physicians are familiar.

Treatment was begun with the ordinary drugs and salicylate of soda, which was then being so much extolled as a germicide, and care of the bottle. Later the treatment was changed to creasote, if vomiting existed, and care of the milk supply. The change was made to bring the treatment more into accord with the generally accepted belief that bacteria are at the bottom of the trouble. Whether special organisms are accepted as probable or not, the belief that changes wrought in the food, inside or outside the body, are the cause of the trouble is held by most.

Long before bacteria were thought of as the cause of the disease the usual routine treatment had a decidedly germicidal tendency. Gray powder probably acts as a mild germicide in the stomach, and lower down in the canal helps to sweep them out; while the care of the bottle is nothing but an effort to avoid bacteria and their effects. Lastly, a host of patent foods, advertised as germ free, have come into the market.

It is a curious fact that while all older people are chiefly fed on sterilized food—that is, cooked food—infants are fed on food peculiarly adapted, by its composition and fluid state, to offer a home to bacteria.

Investigation of the milk supply soon showed that this was greatly at fault; though "fresh each day," it was, as a rule, found to be decidedly acid, often curdling if heated, by the time it was fed to the infant. This the infant, unable to talk and knowing nothing better, was obliged to take or go empty. So, remembering the custom of housewives to scald the milk, directions were given that all milk used for the infants should at once, on receipt, be steamed in a skillet set into the top of the tea-kettle. After this it was kept covered and on ice if possible. The bottles were rarely clean, but were, as a rule, emptied after each feeding. The result was that instead of staying at the point of death, the little patients began to pick up and were soon well, the stools first becoming light, then yellow. I have since undertaken to devise some way by which milk can be practically sterilized—to lay down a rule applicable in any house, by any ordinary nurse.

The ordinary milk supply of a large city is a day or more old, has a slightly acid reaction, and contains many growing bacteria. If kept for

a day it is decidedly acid in reaction, has a sour taste, is apt to curdle if heated, and contains a very large number of bacteria, the cause of the changes. Fresh milk sterilized, or collected sterile and protected from organisms, undergoes no changes even after the lapse of indefinite periods except the separation of the fats. If bacteria are present, a great variety of changes may occur according to the species—for instance, the milk sugar may be turned to acids, the fats broken up, or tyrotoxicon formed. As milk affords such a fine medium for growth, all efforts to rid it of bacteria must be governed by the use of poisons—germicides—or some physical condition inimical to their life. The first method is not admissible in foods, while the other offers little chance of success except by heat. Cold simply retards their growth, does not kill. As boiling produces marked changes, this also is undesirable, so our means are narrowed down to the ordinary one of steaming. Fortunately this produces but slight changes in the milk compared to boiling, and, as I have found, is efficient.

Before reporting the experiments a few preliminary statements are necessary. The milk used came from a private source, eight miles from Boston, was either eight or twenty-two hours old, was kept in an ice-chest, and of very good quality. The only precaution, in the way of sterilization, taken was to heat the test-tubes or flasks in an oven before using them. The flasks were also plugged with cotton-wool rather than a stopper, which is liable to be blown out.

The agar-agar tubes, mentioned in the experiments, are the regular ones used by bacteriologists—that is, test-tubes about one-fourth full of a meat-peptone solution, solidified by the addition of agar-agar. These were allowed to cool on an inclined plane to obtain a large surface. The loop is simply a small loop in the end of the platinum wire, used to convey the substance to be tested for bacteria to the surface of the agar-agar. Esmarchs are made by adding the substance to be tested to some meat-peptone gelatine solution, dissolved by warmth, and then rapidly rotating the test-tube containing it on a horizontal plane of ice. By this means the gelatine solidifies in a thin, even coat on the entire inner surface of the tube. Later the bacteria multiply and form colonies easily counted.

In making inoculations from the milk after steaming all precautions against contamination were taken; the fluid being first thoroughly mixed, so as to obtain due proportions of all the constituents in the part used for inoculation. After steaming the flasks were left at the temperature of the room, as ice, by virtue of its cold, would tend to diminish the severity of my tests.

All the experiments are reported, not only those which were favorable.

EXPERIMENT I.—Thirteen test-tubes of fresh morning's milk were placed in the steamer and heated until steamed for fifteen minutes. On the next

day six of the above were steamed a second time the same way. Before the first steaming an agar-agar culture was made from the milk; in three days the growth was marked.

10*th day*. Agar-agar cultures made from the test-tubes of milk, one loop in each case.

13*th*. All the cultures sterile as yet.

26*th*. One-half of the cultures of the milk steamed but once, show growth; rest sterile.

EXPERIMENT II.—Agar-agar cultures made from the middle of a freshly opened can of Anglo-Swiss condensed milk. In ten days these developed three colonies. At the same time a 10 per cent. solution of the condensed milk was made with hot water, and steamed as in Experiment I., in all eighteen tubes.

2*d day*. Nine tubes steamed a second time.

9*th*. One of the tubes steamed but once has coagulated, all the others have a cream on top, a milky fluid below, and a slight sediment at the bottom. From each tube an agar-agar culture with one loop was made.

24*th*. Two-thirds of those steamed but once have coagulated, and their cultures show growth; the rest, same as before, and cultures sterile.

EXPERIMENT III.—A mixture was made of Mellin's food as directed on the bottle, of 8.5 grammes of the food and 131 c. cm. of water and milk each. This was then placed in eighteen sterile test-tubes, divided into two lots (A) steamed once; (B) steamed twice, as in I.

10*th day*. Both A and B have a brownish cream, fluid, and sediment, but show no signs of coagulation. Agar-agar cultures made with one loop from each.

20*th*. All the cultures from A show a growth, while those from B are sterile.

EXPERIMENT IV.—A mixture was made of cream 50 c. cm., milk 25 c. cm., lime water 50 c. cm., and milk sugar solution[1] 75 c. cm; this was divided into two lots, thirteen test-tubes in all, and treated as in III.

10*th day*. Mixture turned brown at once upon steaming, and so remained; no other visible change. Agar-agar cultures, with one loop made from each.

20*th*. No change in test-tubes; cultures both A and B sterile.

As Dr. T. M. Rotch[2] reports no changes in the cream mixture after steaming, I made the following experiments to discover the source of the brown color in IV.

EXPERIMENT V.—A mixture of one part milk, two cream, and three milk sugar solution was placed in seven test-tubes and steamed for fifteen minutes.

2*d day*. No brown color, cream very thick.

8*th*. No visible change; reaction to litmus paper neutral. Agar-agar culture made from each tube.

23*d*. No changes in the tubes; cultures all sterile.

EXPERIMENT VI.—A mixture of equal parts of cream, milk, and lime water, placed in six test-tubes, and steamed for fifteen minutes.

2*d day*. No brown color; cream on top.

8*th*. Agar-agar cultures made.

23*d*. Tubes all fresh; cultures all sterile.

EXPERIMENT VII.—First boiled lime water and milk sugar solution separately, over a Bunsen burner, and found no change except that lime was left on the side of the test-tube. Next made a mixture of the two, in the proportion of two to three, and divided it up among ten test-tubes. Reaction strongly alkaline. The ten tubes were then put in the steamer. One was taken out in five minutes, another in ten, a third in fifteen, and the rest at the end of a half hour; all were found to be brown, or rather a yellow-brown, the first slightly less so than the rest. They were then tested with litmus paper, and found to show a marked diminution in alkalinity.

No further experiments were made, as the above seemed to show clearly that the brown color was due to the action of the lime on the

[1] Milk sugar 3 1/2 3/4, water 0j.

[2] The Archives of Pediatrics, 1887, vol. iv. p. 462.

milk sugar, like that produced by potassic hydrate, in which case brown products are formed. However this may be, the reaction always took place in my experiments, provided the milk sugar had not become decomposed, as it shortly does if fungi get into the solution.

Why my results should thus vary from Dr. Rotch's is not clear, unless it be that his mixtures had been mixed before he saw them. If examined before disturbing, the cream above is quite light, and the thin fluid below distinctly brown, after mixing the cream makes the whole quite opaque, and the color is almost concealed. It will be remembered Dr. Rotch did not report a test of the reaction after steaming.

In the following experiments the flasks were put in the hot steamer, instead of into the cold steamer and heated up. This was done in order to adopt as much as possible the principle of Pasteurisation; a rapid being more fatal than a gradual change of temperature of the same extent.

EXPERIMENT VIII.—Cream mixture of the same proportions as in IV, was put in eighteen test-tubes, and steamed for fifteen minutes. On the following day nine of them (B) were steamed again for fifteen minutes. All of the tubes, both A and B, became brown during the steaming, and, as was later found, lost much of their alkalinity.

5th day. Agar-agar cultures made from three of A and three of B; milk tested with litmus paper; B found neutral, A faintly alkaline.

9th. One of the agar-agar cultures from A shows a growth.

15th. Another from A shows growth, all B are sterile.

EXPERIMENT IX.—A mixture of Anglo-Swiss condensed milk one part, hot water nine parts, was put in thirteen test-tubes and placed in the hot steamer for fifteen minutes; on the next day seven of these (B) were again steamed for fifteen minutes.

4th day. Cream on top, milky fluid below and slight sediment at the bottom, but no visible signs of decomposition. Three agar-agar cultures made from each A and B.

20th. All the agar-agar tubes sterile.

EXPERIMENT X.—To a mixture of Anglo-Swiss condensed milk like the last was added an old culture of a bacillus producing putrefaction. All twenty tubes were then placed in the hot steamer. Four were removed in five minutes (A), four in ten (B), four in fifteen (C), and the remaining eight in twenty (D).

3d day. Agar-agar tubes inoculated from two tubes of each lot of milk, making eight in all.

8th. One of A is negative, the other shows a good growth; B, C, and D, sterile.

16th. The other A and one of the C tubes have taken, rest sterile. Ultimately all the milk tubes but one steamed for twenty minutes decomposed.

EXPERIMENT XI.—Fifteen test-tubes were filled with milk and put in the hot steamer, they were removed in lots of five at the end of five, ten, and fifteen minutes. At the same time three gelatine Esmarch tube cultures were made, each containing two drops of the fresh milk.

2d day. Agar-agar cultures made with one loop from each of the tubes of milk.

3d. The Esmarchs contain about 250 colonies each.

14th. All the agar-agar tubes are sterile, but the milk has coagulated in all but three tubes.

EXPERIMENT XII.—This experiment was the same as the last, except that the agar-agar tubes were inoculated from the milk four days after steaming instead of one day.

8th day. All five of those steamed for five minutes show growth, also one of those steamed for ten.

12th. Three more of those steamed for ten minutes show growth. All the milk tubes steamed for five or ten minutes have coagulated, also one of those steamed for fifteen minutes. No further changes occurred.

EXPERIMENT XIII.—Fifteen test-tubes were steamed as in the last two experiments and stood aside to be tested for their bacterial contents at the end of fourteen days. At the end of this time all of the tubes but one of those steamed for fifteen minutes had clotted, so no cultures were made.

EXPERIMENT XIV.—Three flasks each containing 100 c.cm. of milk were put in the hot steamer for fifteen minutes.

2d day. Agar-agar cultures were made from the flasks.

32d. Agar-agar tubes still sterile.

EXPERIMENT XV.—This experiment was the exact counterpart of Experiment XIV. and gave the same results.

EXPERIMENT XVI.—One flask containing 200 c.cm. of milk was put in the hot steamer for fifteen minutes.

2d day. Agar-agar tube inoculated with one loop from the flask.

30th. Agar-agar tube sterile.

EXPERIMENT XVII.—Four tubes each containing 100 c.cm. of milk were steamed for fifteen minutes.

7th day. Milk acid in reaction, but shows no visible change. Agar-agar tube inoculated from each flask by a loop.

12th. One of the agar-agar tubes shows a good growth.

20th. Another of the agar-agar tubes has taken.

30th. The other two agar-agar tubes are still sterile.

EXPERIMENT XVIII.—Three flasks each with 100 c.cm. of milk were steamed for fifteen minutes.

2d day. Three agar-agar tubes inoculated, with a loop, from the three flasks; milk also tested with litmus paper and found to be faintly acid.

15th. The three agar-agar tubes are sterile.

EXPERIMENT XIX.—A test-tube of the lot of milk used in the last was set aside for a day and then three agar-agar tubes inoculated, each with one loop.

4th day. The agar-agar tubes are simply swarming with bacteria.

EXPERIMENT XX.—Five agar-agar tubes were inoculated with one loop each from the lot of fresh milk used in Experiment XVIII.

5th day. All show good growth with isolated colonies on the edge.

If we stop to review the results of the above experiments it is at once seen that milk cannot often be sterilized by one steaming. Of the one hundred and twenty odd lots of milk steamed but once, all but four or five showed distinct signs of change within a month. Two which appear sterile are, however, still in my possession after twice that lapse of time. How it happened that these few are sterile will be explained later on. On the other hand, the majority of those steamed twice did not change at all; those which did change, it may be added, coagulated at about the same time as those steamed but once.

But if we look over the data of the agar-agar tubes inoculated by the loop, we see that such may be sterile even if made from milk which has stood for a long period. This is shown by Experiments I., II., III., and V., where the milk had stood from seven to ten days after being steamed before the culture was made. That the loop was sufficiently large to carry enough milk to contaminate the agar-agar is shown by XX. No more such experiments are reported, though many were made in the

course of other work, as all showed the loop to contain quite a number of bacteria.

Turning to the twenty agar-agar tubes inoculated from milk which had stood one day, we find that all failed to show any growth. It was evident, therefore, that steaming for fifteen minutes offered good prospects of success.

Before passing to my final experiments to elaborate this point, it must be noted that on several occasions the growth of bacteria on the agar-agar had not become distinctly visible until the tenth day.

The following experiments go in threes: a gelatine Esmarch culture was made with one drop of milk or mixture used, then the flasks, each containing 100 c.cm. of the substance, were steamed for fifteen minutes; and lastly, a part was set aside stoppered in the room. As soon as the flasks were steamed they were put beside the one not steamed. At the end of twenty-four hours Esmarchs were made from all, one drop being taken by a sterile pipette. By this means it was possible to count the number of bacteria in a drop of the substance, a large quantity, before steaming and a day after it had been steamed, and to gather an idea of what the number would have been if it had not been steamed.

EXPERIMENT XXI.—Four flasks were filled, each with 100 c. cm. of milk, and then steamed at once for fifteen minutes, after which they were stood away for a day. At the end of this time four Esmarchs were made from the four flasks, with one drop each.

3*d day*. No signs of growth in the Esmarchs.

11*th*. The Esmarchs show 0, 1, 3, and 10 colonies respectively, all of one kind.

EXPERIMENT XXII.—Two Esmarchs were made with one drop each from the fresh lot of milk used in the last.

7*th day*. Calculations made in the usual way by counting the colonies in a given area, and multiplying by the total area give 1644 and 1391 colonies.

EXPERIMENT XXIII.—Steamed three flasks, each with 100 c. cm. of milk for fifteen minutes.

2*d day*. Made Esmarchs with one drop from each of the three flasks.

9*th*. All sterile.

20*th*. All sterile.

EXPERIMENT XXIV.—A test-tube filled from the lot of milk used in the last was set aside till the following day, when two Esmarchs, with a drop each, were made at the same time as those of XXIII.

4*th day*. Esmarchs entirely dissolved by the minute colonies, thus showing the presence of innumerable bacteria in the milk.

EXPERIMENT XXV.—One gelatine test-tube was inoculated with one drop of the fresh milk, and should have been rolled out into an Esmarch but was forgotten.

4*th day*. Full of colonies, but it is impossible to count them in the mass of gelatine.

9*th*. Gelatine all dissolved for some time.

EXPERIMENT XXVI.—Mixture made of 7 grm. Mellin's food and 150 c. cm. of hot water, after the food was dissolved, 150 c. cm of milk were added, and the whole steamed. Two flasks were then filled with 100 c. cm each, and steamed for fifteen minutes.

2*d day*. Esmarchs, one drop made from each.

5*th*. Each Esmarch contains one colony.

19*th*. No change.

EXPERIMENT XXVII.—Two Esmarchs made, with one drop each, from the fresh lot of Mellin's food used in the last experiment.

3*d day*. One Esmarch shows 18, the other 20 colonies.

8*th*. They now show 30 and 34 colonies.

15*th*. No change in the numbers.

EXPERIMENT XXVIII.—Sample from the mixture used in Exp. XXVI. set aside until the next day, when an Esmarch with one drop was made.

3*d day*. Esmarchs contain so many minute colonies it is impossible to count them; the whole shortly dissolved.

EXPERIMENT XXIX.—A mixture was made of one part Anglo-Swiss condensed milk and ten parts hot water. From this two flasks, 100 c. cm. each, were filled and steamed for fifteen minutes.

2*d day*. Esmarch, with one drop, made from each.

5*th*. No colonies visible.

12*th*. One Esmarch is sterile, the other has one colony.

16*th*. No new colonies.

EXPERIMENT XXX.—Two Esmarchs were made from the fresh mixture used in the last experiment, each with one drop.

5*th day*. The Esmarchs show 646 and 612 colonies, according to calculation; these shortly dissolved the gelatine.

EXPERIMENT XXXI.—A test-tube full of the condensed milk solution used in Experiment XXIX. was set aside for a day, when an Esmarch with one drop from it was made.

5*th day*. The fourth day of the Esmarch, calculation derived from counting the colonies in a small square with a strong lens gave 9750.

EXPERIMENT XXXII.—A mixture of seven grms. Mellin's food, hot water, and milk, each 150 c. cm., was carefully made and steamed. Two flasks were then filled with 100 c. cm. each and steamed for fifteen minutes.

2*d day*. Esmarchs, one drop, made from each.

4*th*. One Esmarch shows one colony, other none.

15*th*. No new colonies.

EXPERIMENT XXXIII.—Esmarch made with one drop of the fresh mixture used in the last experiment.

4*th day*. Thirty colonies.

10*th*. Forty colonies. No new colonies occurred later.

EXPERIMENT XXXIV.—Esmarch with one drop of the mixture used in the last two experiments, after standing for a day. By this time the top was brown and dirty looking.

2*d day*. The whole is dissolved.

EXPERIMENT XXXV.—One flask was filled with 100 c. cm. of milk and steamed for five minutes.

2*d day*. Esmarch with one drop made.

13*th*. Two colonies.

EXPERIMENT XXXVI.—An Esmarch was made with one drop of the fresh milk used in the last experiment.

4*th day*. Sixty colonies by count.

Shortly dissolved in places so no later count could be made.

EXPERIMENT XXXVII.—A sample of the milk used in the last two experiments was set aside for a day; then an Esmarch made with one drop.

3*d day*. Esmarch all dissolved.

EXPERIMENT XXXVIII.—Two flasks of milk, each 100 c. cm., were steamed for ten minutes.

2*d day*. Made an Esmarch with one drop from each.

4*th*. No colonies in the Esmarchs.

18*th*. No colonies.

EXPERIMENT XXXIX.—Esmarch with one drop of the fresh milk used in the last experiment.

4*th day*. Careful count gave 84 colonies. All dissolved in a few days.

EXPERIMENT XL. A sample of the milk used in the last two experiments was set aside for a day, when an Esmarch was made with one drop from it.

4*th day*. Esmarch dissolved.

EXPERIMENT XLI.—A mixture of cream 70 c. cm., milk 35 c. cm., lime water 70 c. cm., sugar and lime water 105 c. cm. made. From this, two flasks were filled with 100 c. cm. each, and steamed for fifteen minutes.

2d day. Esmarchs made with one drop from each.

9th. No colonies.

17th. Esmarchs sterile.

EXPERIMENT XLII.—Esmarch made with one drop of the fresh mixture used in the last experiment

3d day. About 150 colonies.

7th. Gelatine dissolved.

EXPERIMENT XLIII.—A sample of cream mixture set aside.

2d day. Esmarch with one drop made.

3d. Looks to be crowded with colonies.

7th. All dissolved.

EXPERIMENT XLIV.—From a mixture of one part Anglo-Swiss condensed milk and ten parts water, two flasks were filled with 100 c. cm. each and steamed for fifteen minutes.

2d day. Esmarch with one drop made from each.

17th. Both Esmarchs are still sterile.

EXPERIMENT XLV. Esmarch with one drop made from the fresh mixture used in the last experiment.

3d day. Nothing visible yet.

13th. About 200 small and 2 large colonies.

EXPERIMENT XLVI.—A sample of the mixture, used in the last two, set aside for a day, when the customary Esmarch was made.

9th day. Two-thirds dissolved by about forty large colonies, solid parts stippled with pin-point colonies.

EXPERIMENT XLVII.—A cream mixture was made in the same proportions as before, and two flasks, 100 c. cm. each, filled from it; the flasks were then steamed for fifteen minutes.

2d day. Esmarch made as usual.

8th. No colonies to be seen.

16th. Both Esmarchs sterile.

EXPERIMENT XLVIII.—An Esmarch with one drop of the fresh cream mixture was made.

2d day. Several minute colonies.

8th. Esmarch dissolved.

EXPERIMENT XLIX.—A sample of the cream mixture used in the last two was stood aside for a day, when an Esmarch with one drop was made.

8th day. Dissolved.

I have put the results of the later experiments in a table, to help comparison. The α sign indicates that a large number of colonies developed and dissolved the gelatine before they had grown large enough to count.

In looking over the table it is at once seen that very few or no colonies developed from the material steamed. Out of twenty-two trials, in eight bacteria were found, in fourteen none were found. Of the eight cases, only one colony each was found in five.

The calculations from the fresh mixture before steaming show from 30, in a mixture of Mellin's food, to 1644, in a sample of milk; the average for the milk being about 75. In the one case where a count was secured from the mixture after standing a day, we found 9750. Very likely the others contained more.

It is, therefore, clear that the method followed has been very successful in killing bacteria, and keeping the milk for a long period. We

may thus lay down the following rules in answer to our problem: Stopper the flasks with cotton wool and heat them in the oven for thirty minutes, at a mild baking heat, or until the wool becomes brown. Pour the requisite quantity of food into the flask and then place in the heated steamer for fifteen minutes.

Experiment, and substance used.	Quantity.	Time steamed.	Time stood.	No. of bacteria
XXI.	c. m.	seconds.		
Milk.	100	15	1 day.	0
Milk.	100	15	1 "	1
Milk.	100	15	1 "	3
Milk.	100	15	1 "	10
XXII.				
Milk.	.....	.....	.....	1644
Milk.	.....	.....	.....	1391
XXIII				
Milk.	100	15	1 day.	0
Milk.	100	15	1 "	0
Milk.	100	15	1 "	0
XXIV				
Milk.	.....	.....	1 "	a
Milk.	.....	.....	1 "	a
XXVI.				
Mellin's.	100	15	1 "	1
Mellin's.	100	15	1 "	1
XXVII.				
Mellin's.	.....	.....	.....	30
Mellin's.	.....	.....	.....	34
XXVIII.				
Mellin's.	.....	.....	1 day.	a
XXIX				
Cond. milk.	100	15	1 "	1
Cond. milk.	100	15	1 "	0
XXX.				
Cond. milk.	.....	.....	.....	646
Cond. milk.	.....	.....	.....	612
XXXI.				
Cond. milk.	.....	.....	1 day.	9750
XXXII.				
Mellin's.	100	15	1 "	1
Mellin's.	100	15	1 "	0

Experiment, and substance used.	Quantity.	Time steamed.	Time stood.	No. of bacteria.
XXXIII.	c. m.	seconds.		
Mellin's.	.....	.....	.....	40
XXXIV.				
Mellin's.	.....	.....	1 day	a
XXXV.				
Milk.	100	5	1 "	2
XXXVI.				
Milk.	.....	.....	.....	60
XXXVII.				
Milk	.....	.....	1 day.	a
XXXVIII.				
Milk.	100	10	1 "	0
Milk	100	10	1 "	0
XXXIX.				
Milk.	.....	.....	.....	84
XL.				
Milk.	.....	.....	1 day.	a
XLI.				
Cream milk.	100	15	1 "	0
Cream milk	100	15	1 "	0
XLII.				
Cream milk.	.....	.....	.....	150
XLIII.				
Cream milk	.....	.....	1 day.	a
XLIV.				
Cond. milk.	100	15	1 "	0
Cond. milk.	100	15	1 "	0
XLV.				
Cond. milk.	.....	.....	.....	202
XLVI.				
Cond. milk.	.....	.....	1 day.	a
XLVII.				
Cream milk.	100	15	1 "	0
Cream milk.	100	15	1 "	0
XLVIII.				
Cream milk.	.....	.....	.....	a
XLIX.				
Cream milk.	.....	.....	1 day.	a

The first rule is an advantage, and easily done, but not of great importance. The second is both easily done and goes to the root of the subject. Any cooking steamer with a perforated false bottom and a snug cover will do; or the lower part of a Chamberlin's steamer; the heat must be sufficient to keep the water in active ebullition.

For the benefit of those who are not familiar with the technique of bacteriology, or familiar with steamers, a diagram of a section is given, showing the principles and essential elements of construction. The vessel should be of good size, at least eight inches across the bottom

—better a foot, and sixteen inches high. Inside, four inches from the bottom, there should be a projecting rim, on which should rest a metal plate perforated with numerous holes a half inch in diameter. The cover should be tight so as to hold in the steam and prevent the ingress of air. For use, two or three inches of water should be placed in the bottom and brought to a fast boil, when the flasks should be set as near the centre of the diaphragm as possible, the cover replaced, and the whole allowed to steam for fifteen minutes. The flasks should then be taken out and stood in the cold, of course to be brought up to the body temperature before feeding.

The chief source of failure lies in an insufficient supply of steam to keep the upper chamber full; the heat must be ample, that of a range or Bunsen burner. Where the additional expense can be borne, it is better to cover the outside of the steamer with a thick jacket of felt, extending to within two inches of the bottom.

The milk should be steamed when *first* received, preferably in the flasks from which it is fed to the infants. This requires a few more bottles, as many as the infant is fed times during the day, but will well repay for the trouble. If the milk is allowed to stand before steaming, the advantages of the method are done away with in great part. The milk may be sweet, but has already been acted upon by bacteria, and is certainly unhealthy. In case a sufficient number of flasks cannot be afforded, the milk should be steamed in a few larger ones, kept stoppered with cotton-wool, and drawn from as needed. This is the best method to employ in hospitals, where the contents of a large flask will be used up in a short time.

The secret of the success of this method lies in the well-known fact that the vegetative forms of bacteria succumb to a moist temperature of 100° C. (212° F.); that spores develop slowly; and lastly, but not least, that in milk, being an excellent medium for growth, spores rarely form, spore-formation among bacteria, like seeding among higher plants, being a phenomenon of impaired growth. The dearth of spores in ordinary milk can be demonstrated by the use of the microscope and patience.

Fifteen minutes' steaming is advised rather than five or ten, as some of the earlier experiments reported show the longer period to be more effective. The entire mass of fluid used must be heated up to the boiling-point; for this time is requisite; it is not without significance that the fifteen minutes' steaming is that employed by bacteriologists to sterilize their media.

The preservation of some of the milk steamed but once is explained by the absence of any enduring spores from the start.

REVIEWS.

THE RULES OF ASEPTIC AND ANTISEPTIC SURGERY.* A PRACTICAL TREATISE FOR THE USE OF STUDENTS AND THE GENERAL PRACTITIONER. By ARPAD GERSTER, M.D., Professor of Surgery at the New York Polyclinic; Visiting Surgeon to Mount Sinai Hospital and the German Hospital, New York. Illustrated with 248 engravings and 3 chromo-lithographic plates. 8vo. pp. 326. New York: D. Appleton & Co., 1888.

IT would be futile, within the compass of this review, to attempt anything like an elaborate analysis of this work; in fact, it presents an inherent and insuperable obstacle to this method of treatment, because a large portion of the text consists of notes of cases illustrative of the principles inculcated by the author. Nothing more, then, will be attempted than a hasty glance at the contents of the book, with such brief comments upon its peculiarities, excellences, or defects, as space may permit.

The conditions favoring sepsis and asepsis are first considered, and the former shown to be due invariably to the presence of micro-organisms. Attention is called to the fact that for some, as yet unexplained, reason aseptic precautions often fail to avert suppuration in diabetics.

The treatment of aseptic wounds is next considered, and full directions given as to cleansing hands, instruments, and the preparation of dressings. Simple yet effective and portable arrangements are suggested for private operations. Instead of cumbering the work by descriptions of the endless varieties of antiseptic dressings and solutions, the author mentions merely types of dressings, such that by simple exsiccation, chemical sterilization combined with exsiccation, Schede's modification of the dry dressing favoring the organization of moist blood-clot, and simple chemical sterilization. Carbolic acid, corrosive sublimate, and Theirsch's solutions are those relied upon. Drainage is by rubber tubes, which are left for from ten to fourteen days. Surely this is unnecessary and often harmful. Capillary drainage by catgut is thoroughly reliable, *if properly used in aseptic wounds*, even of the magnitude of the major amputation wounds, as we have proved for years past. If pus forms, of course capillary drainage will fail; but in the author's words, "The surgeon's acts determine the fate of a fresh wound," and "Its infection and suppuration are due to his technical faults of omission or commission." We would call attention also to the advantages of the addition of five parts of acid. tartaricum per thousand, to the corrosive sublimate solution; which, as Laplace has shown, prevents the formation of the inert albuminate of mercury, and preserves the solution; this is no omission of the author's, since these observations have only been recently published. Special applications of the aseptic method to the most diverse classes of cases then follow,

illustrated by the accounts of the operation, but *not* illustrated, we are bound to say in most instances, by the *cuts* intended for that purpose.

Soiled wounds with the application of *antiseptic* methods are fully considered, and the opportunity taken of pointing out the essential differences between the two methods.

Entirely too much space has been taken up with cuts of instruments, the technique of surgical dissection, and very imperfect accounts of the methods of diagnosis of many surgical affections. Hence these parts, while wholly unnecessary in a work on the Rules of Aseptic Surgery, etc., swell the bulk of the book, and will be apt to mislead the inexperienced, since, although correct as far as they go, they are not full enough to prevent a tyro from coming to wrong conclusions. The author's principle in surgical dissection to "do every step under the guidance of the eye," may be admissible in theory, and is certainly aimed at by all surgeons, but equally certainly will lead to unnecessary mutilations if carried out in every case; thus we do not think Gerster's advice is good with regard to herniotomy, to divide the stricture from without inward in all cases, as in certain cases this will result in nothing short of a laparotomy.

We are glad to note that Gerster, by a brief reference to the well-known experiments of Grawitz and a few pregnant sentences, disposes of the extremely disingenuous statements of Lawson Tait that his results are not dependent upon the recognition of the Listerian *principle*. Thus, he says, "This fact" (the power of absorption by the healthy peritoneum of a certain number of active pyogenic micrococci and their subsequent destruction in the blood) "goes very far to explain Lawson Tait's position, who, however, although disclaiming antiseptics, devotes most scrupulous care to *asepticism*—that is, to the cleansing of hands and instruments. His instruments are few, and selected with a view to simplicity. *His sponges are put into carbolic lotion for disinfection.* The water used for the immersion of his instruments is sterilized by boiling. Most of the bacteria contained in his "water from the tap," are innocuous—that is, non-pyogenic; and those that have the power to cause suppuration are too few to produce serious trouble. They are simply absorbed and killed off by the great germicide, the blood."

"Antisepsis" is considered in connection with the subject of idiopathic suppuration, wherein it clearly appears that "antisepsis" is merely a convenient name for the treatment of suppuration, which is shown to be *always* due to the presence of microörganisms and only to be checked by their destruction.

We heartily commend this section to the student, general practitioner, and to a certain number of surgeons who resemble the "deaf adder who stoppeth her ears to the voice of the charmer, charm he never so wisely."

In the section on the aseptic and antiseptic treatment of tubercle, the author contends that suppuration never results from the tubercle bacillus, but is caused by the accidental inoculation of the tubercular masses by one or more of the forms of the cocci of suppuration.

"Gonorrhœa, its antiseptic treatment," is to us one of the least satisfactory sections, but that is, perhaps, because "the wish became father to the thought," and we expected too much help in the treatment of this most annoying malady.

The closing chapter treats of syphilis, so far as its external lesions are concerned.

The chief, if not the only advantage offered by Dr. Gerster's method of treatment, is the impossibility of infecting another woman while the patient is suffering from a primary lesion, since "*syphilitic ulcers of every kind present a combination of syphilitic and pyogenic infection*, whence it follows that the "*aseptic protection of the surface of the primary induration offers an easy remedy for preventing the formation of the primary ulcer or chancre.*" Few of us are fortunate enough to see a primary lesion *before* ulceration has occurred.

Should more proof be adduced than that afforded by the author's single case, surgeons would do well to imitate Dr. Gerster, although even without antiseptic drugs we think the character and bulk of the dressings would effectually prevent intercourse, and, therefore, infection of another! Unfortunately, he does not tell us how to dress a woman with a primary lesion before ulceration has occurred.

In conclusion, we would commend this work to our readers, believing that it will inform the ignorant and confirm the wavering better than any of its predecessors not only by its merits, but because it is not *controversial.* C. B. N.

TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY. Twenty-third annual meeting, 1887. Boston: Published by the Society.

THIS, the oldest of the American special societies, publishes its transactions in annual parts that, in external appearance, do not compare favorably with the neat volumes issued by most of its younger sisters. But on looking within, one easily perceives evidence of such scientific success, that it is not surprising that the society has shown great unwillingness to change the time, place, and conditions of its meetings; even to secure the opportunity of meeting professional brethren devoted to other lines of professional work. The success of the society, working on its present plain, is already evident; that equal or greater success would attend the proposed departure, is quite probable, but not yet demonstrated. The minutes of the proceedings, here published with the scientific papers and discussions, are very suggestive of the means by which the society secures the success of its meetings. They are held at the time of year when the members have most leisure to attend, at a delightful summer resort where there is little liability to outside distractions; three meetings a day, extending from 9 A. M. to 11 P. M.; routine business reduced to a minimum; and "medical politics" left out altogether.

Among the important papers contained in this issue we find one by Dr. Swan M. Burnett entitled, "Clinical Contributions to the Study of Ring Scotoma." In this affection the defect in the field of vision takes the form of a more or less complete ring, or circular zone; while the centre of the field and the extreme periphery remain more nearly normal. The histories of two cases are here given, with seventeen cuts, illustrating the extent of the scotomata at various stages in their progress; and a good bibliography of the subject is appended. This affec-

tion has usually been regarded as due to some lesion of the retina or choroid; but Burnett believes it to be due to a retro-ocular neuritis, and effectively supports his view, by showing it in harmony with the observed facts, both anatomical and clinical. In the discussion which followed the reading of this paper five additional cases were reported.

Dr. F. Buller describes "A Rare Form of Ophthalmia Granulosa Associated with Ichthyosis," hitherto unrecognized. It is distinguished from the ordinary forms of trachoma by differences in the form, size, and color of the granulations, and their extreme hardness; by absence of any tendency to inflammatory exacerbations; by the character of the secretions; by the apparently non-contagious character of the affection; and by its absolutely passive behavior under the ordinary treatment for trachoma.

Dr. S. Theobald reports "A Case of Recurrent Retinal Hemorrhages, followed by the Outgrowth of Numerous Bloodvessels from the Optic Disk into the Vitreous Humor." This outgrowth of bloodvessels was followed by a return of vision to the normal, and a cessation of the hemorrhages, at least temporarily. The reported discussion on this paper includes similar cases narrated by Drs. Carmalt and Wadsworth.

Dr. George C. Harlan gives a minute account of a case of "Embolism of the Central Retinal Artery," first seen within eighteen hours of its occurrence. At this time, "The arteries were very pale, though not much narrowed, and some of the smaller branches seemed lost in the retinal œdema. The larger veins were contracted in places, but generally of full calibre. The superior temporal vein was contracted to a thread on the disk and a little beyond it, but was slightly distended toward the periphery, and the blood could be distinctly seen moving through it, in bead-like sections, slowly and continuously toward the disk. The same kind of movement, in the opposite direction, could be distinguished with some difficulty in the corresponding artery." The next day this movement had ceased in the artery, and was just ceasing in the vein. Ultimately, the color of the fundus became normal. "Disk dead white. Veins rather narrow, uniform calibre, light color." Two of the larger arteries were just visible, near the disk. "They were pale and narrow, and a delicate white line could be traced along their margins." "Some of the smaller branches, before invisible, could now be traced by a just perceptible white thread." This paper is illustrated by a plate showing the earlier, and the final appearances of the fundus.

Dr. William F. Norris reported cases of "Primary Acute, Primary Hemorrhagic, and Secondary Glaucoma," and illustrated his remarks upon them by photo-micrographs, shown as lantern-slides, which are reproduced. Among other things, a study of the cicatrices showed "In each case a displacement of the relative position of the corneal flap and of the corneal stump from which it was cut. In each instance the edge of the flap rides up a little, while the cut edge of the proximal portion of the cornea projects deeper into the anterior chamber." After pointing out the fact that the majority of the similar plates in Becker's *Atlas* show a corresponding displacement of the cut edges, Norris continues: "These facts seem to me to present good anatomical reasons for the utmost diligence on the part of the practitioner to prevent any undue motion of either the body or eyes of the patient after operations, until the wound is sufficiently closed by adherence of the cut surfaces to make it probable that it will not readily give way or be displaced." In this

connection attention might be called to the fact, that in these operations the corneal incision is always somewhat oblique, and that the obliquity is such that, when the sides are in any way forced together, the flap will always ride up on the stump in the way described above. Now since any pressure made upon the wound, through the lids, will tend to force the lips of the wound together, this series of cases should direct attention to the danger of displacement by a dressing which makes decided pressure on the eyeball.

Dr. C. S. Bull contributes a paper on "Passive Motion in the Treatment of Paralysis of the Ocular Muscles," giving the results obtained in twenty-one cases, by the use of the method proposed by Prof. Michel. In carrying out this plan of treatment: "The paralyzed muscle is to be seized at its line of sclerotic implantation with a pair of ordinary fixation forceps, and the eyeball is then to be pulled backward and forward in the direction of the line of contraction of the affected muscle as far as possible toward, or even beyond the limit of the contraction, and then back in the reverse direction, as far as the limit of extreme relaxation, and these to-and-fro movements are to be continued for about two minutes." "The pain caused by the manipulation, when no anæsthetic is used, is in most cases severe, and is by no means entirely relieved by cocaine. The conjunctival irritation caused by the treatment is considerable, but usually transient." Of the cases here reported, eight were cured, six were partially relieved, and seven were not improved. Some of the cures were accomplished after the failure of other methods of treatment to give relief.

Dr. O. F. Wadsworth reports "A Case of Congenital Zonular Grayish-white Opacity around the Fovea;" also one of "Detachment of the Retina in Both Eyes, with Albuminuria of Pregnancy; Replacement of Retina." Dr. S. D. Risley gives additional cases of "Hypermetropic Refraction Passing while under Observation into Myopia;" and Dr. B. A. Randall, "A Case of Rapid Development of Lenticular Opacity." But we cannot here refer, even by title only, to many of the important papers these *Transactions* contain. As usual, cataract extraction, and new instruments and appliances of various kinds, occupy a share of space. The financial vigor and liberality of the Society are evinced by some sixty original illustrations, including two chromo-lithographs of the fundus from sketches by Dr. P. N. K. Schwenk. There is also a photograph of the late Dr. Ezra Dyer, one of the founders of the Society, with a memorial sketch by Dr. H. Derby. E. J.

DISEASES OF THE BONES: THEIR PATHOLOGY, DIAGNOSIS, AND TREATMENT. By THOMAS JONES, F.R.C.S. Eng., B.S. Lond.; Surgeon to the Manchester Royal Infirmary; Lecturer on Practical Surgery in the Owens College, Victoria University; Consulting Surgeon to the Children's Hospital, Pendlebury, Manchester. With illustrations. 8vo. pp. 361. London: Smith, Elder & Co., 1887.

THIS work aims to be an exposition of our present knowledge of diseases of the bones, viewed from a clinical standpoint, and is fully

illustrated by some very creditable chromo-lithographic plates, and a number of admirable etchings. Owing to the rarity of modern monographs treating of bone disease, there certainly is room for a work of this kind, and this vacancy is, upon the whole, well filled by the present monograph, although the different sections of the book are of very unequal merit. A cursory glance at some of the most striking points which we have noted while perusing the book will give some idea of the merits and demerits of the work.

The utter absence of all accessory aids to the osseous venous blood-currents, such as is afforded by the contractions of muscles, is emphasized, explaining, as it does, so many points in bone pathology. Calcification of the costal cartilages is regarded not as "a normal senile change," but a degeneration. When speaking of the osseous changes in nervous diseases, it is stated that only ten per cent. of the insane present clear and precise bony lesions which render fracture certain upon the application of slight force, while in the remainder the skeleton resembles that of those who suffer from any general failure of nutrition, such as phthisis, or old age. Something akin to osteomalacia is also observed, which is productive of various deformities.

A medico-legal point of importance is dwelt upon, viz., that comparatively trivial blows incurred by falls upon the trochanter major may in the *young* as well as in the old produce "shortening of the neck and considerable deformity of the limb," and a case in point of a patient aged fifteen years is cited. We cannot understand the propriety of the advice that when suppuration follows bone diseases, the result of typhoid and other fevers, "the disease being chronic and circumscribed, it is better to allow the pus to be absorbed or to escape spontaneously." We did think that a "pyogenic membrane" was a thing of the past, but it appears not, at least to Mr. Jones. Attention is called to the occurrence, "long after growth is complete," of acute suppurative osteomyelitis in adults, and that the prognosis is much graver in them than in the young.

We think the author's advice, while differing from the established practice in chronic osteitis of the articular extremities of bone resulting in caries, and attended with *severe pain*, is excellent, viz., "to expose the bone and open up its cancellous interior with a trephine;" many a joint will thus be saved. Early and free removal of the portion of the bone affected is recommended in phosphorous necrosis as "the only treatment at all likely to succeed." Two cases of another surgeon's are quoted to show the propriety of occasionally resorting to free incisions down to the bone, in cases of specific periostitis which resist long and well-directed antisyphilitic treatment.

Mr. Jones recognizes "no essential difference between the tubercular and scrofulous diseases of bone." "An affection is stamped as tubercular when the diseased tissues possess the typical structure . . . . and the bacillus tuberculosis is present." König's rule with regard to operations for bone-tubercle is stated and approved, viz.: "The surgeon should interfere in tuberculosis of bones and joints only when the local condition demands it, and the fear of secondary general tubercular affection does not constitute a sufficient indication." Moreover, the author believes that "constitutional infection is often favored, if not directly provoked, by the operation and by it alone." Actinomycosis has a short chapter devoted to its consideration.

Mr. Jones believes in the saw for "all osteotomies" and having used it in "something like three hundred osteotomies without any mishap," he says "I shall be slow to adopt any other instrument." Osteoclasis is fully considered, but the conclusion arrived at is that "it is difficult to see how this proceeding ever hopes to supersede osteotomy, which is simple, requires no complicated instruments, is free from danger, and yields such excellent results."

Electrolysis is recommended for fibrous naso-pharyngeal polypi when repeated hemorrhages have reduced the patient to such a condition as to forbid a prolonged operation, as by this means the bleeding has been checked, and the bulk of the tumor so diminished as "to render its removal through the ordinary channels an easy matter."

The chapters on malignant tumors of bone are the best in the book, and are so replete with points of interest as to demand full perusal to do them justice. We must, however, take exception to the positive injunction that "no attempt should be made to remove sarcomas of the skull," since the fibrous variety is, and has proved, amenable to operative interference. Sarcomata of the foot are shown to be so apt to generalize that nothing short of amputation at some distance from the disease should be contemplated. Operations for subperiosteal sarcomata of the clavicle are discountenanced, as the disease recurs at an early period. The occurrence of primary carcinoma is admitted, and a case (epithelioma) in the author's practice reported.

In conclusion, let us say that while not exactly our ideal of what such a book should be, it is a decided addition to the literature of the subject, containing, as it does, a condensed account of what of prime importance is known of, or is recommended for, the affections described. Moreover, the author's recommendations carry with them the conviction that they are founded on an extensive clinical experience, and when there are differing plans of procedure we think that Mr. Jones's discrimination is just. In fine, we think that the book is a reliable guide to practice.

C. B. N.

CHEMICAL ANALYSIS OF HEALTHY AND DISEASED URINE. QUALITATIVE AND QUANTITATIVE. By T. C. VAN NÜYS, Professor of Chemistry, Indiana University. 8vo. pp. 187. Philadelphia: P. Blakiston, Son & Co., 1888.

PRACTICAL URINE TESTING. A GUIDE TO OFFICE AND BEDSIDE URINE ANALYSIS. FOR PHYSICIANS AND STUDENTS. By CHARLES GODWIN JENNINGS, M.D., Professor of Chemistry and Diseases of Children, Detroit College of Medicine. 12mo. pp. 124. Detroit: Haynes & Co., 1887.

THE URINE. MEMORANDA, CHEMICAL AND MICROSCOPICAL. By J. W. HOLLAND, M.D., Professor of Medical Chemistry and Toxicology, Jefferson Medical College. 12mo. pp. 43. Philadelphia: P. Blakiston, Son & Co., 1887.

VAN NÜYS's volume may, without question, be considered a valuable addition to the literature of this department of medicine. As a chemist,

the author has entered thoroughly into the chemical side of the subject; yet the reactions given, and the methods of work described, are so clearly explained that a clinician with ordinary training in medical chemistry will be able to understand all, or nearly all, of them. Nor has the author failed to treat the matter from a clinical standpoint, but has indicated the significance of the various bodies found in the urine, either abnormally present or present in abnormal amount. The first chapter is devoted to the properties of the urine, and to the recognition of its normal organic constituents, including urea, the xanthic group of compounds, kreatin, hippuric acid, indican, and others. The second takes up the inorganic constituents. The third chapter, given to the albumens and sugar, was especially interesting to us. It contains a most convenient tabular arrangement of the various reactions of the albuminous bodies—serum albumen, globulin, hemi-albuminose, peptone, and mucin—a feature which, of itself alone, should render the book of value to every physician. We are pleased to see that the phenylhydracin reaction for sugar is included; though we note the omission of all reference to the tests with bismuth, indigo-carmine, and picric acid, and to the naphthol and thymol reactions. We regret to say that acetone, diacetic acid, oxybutyric acid, and formic acid, of whose exact relation to diabetes and of whose detection in the urine we so much need to know more, are not mentioned by the author. The fourth chapter contains descriptions of other abnormal constituents of the urine, such as bile, blood, leucin, tyrosin, neurin, lecithin, etc., together with the more reliable tests for them. The fifth chapter includes an illustrated description of the sediments peculiar to urine; the sixth consists of a systematic scheme for the qualitative analysis of healthy and diseased urine; gives clear, concise information for the methods of procedure to be employed, and is followed by a similar scheme for the microscopical and chemical study of the urinary sediment; while the seventh chapter takes up the qualitative analysis of calculi. The remainder of the book is occupied by the subject of quantitative examination. This portion is treated very fully, and the author gives descriptions of nearly all the methods employed in quantitative work. Almost one-half of the volume is allotted to this department.

It is but right to correct a mistake regarding an apparatus described here. That, namely, figured as "Green's," for the hypobromite method of estimating urea, is, we believe, the one designed by Marshall, and now used in the University of Pennsylvania. Green's apparatus is illustrated in the fifth edition of Tyson's *Guide to the Practical Examination of Urine.*

Written on a plan entirely different from that of the last work, and only one-half its size, Jenning's little book discusses as briefly as possible the subjects which it must needs contain. "It is the aim of the author . . . to give concise directions for office and bedside testing, embodying all the latest advances that have proved of value," and the aim appears to have been fulfilled. By means of heavy type for headings, and the emphasized words, the book has been made a convenient guide for rapid work. Part I. treats briefly of the chemistry of the urine and of the relative delicacy of the various reactions; and contains, in addition, a large amount of tabularly arranged information as to the diseased states in which alteration of the urinary secretion is present. We have, for example, an

etiological classification of albuminurias, and one of hæmaturias, and lists of diseases in which certain of the principal normal urinary constituents are increased or diminished in amount, or in which abnormal substances appear. For ready reference to information of this nature we know of no more convenient publication, especially for the practising physician. Part II. is devoted solely to the analysis of the urine, without further mention of the diseases concerned. Though very comprehensive, including a large number of the reactions usually published for qualitative work, the descriptions are necessarily very brief. The book, in this particular, can be recommended to the busy practitioner rather than to him who is greatly interested in urinary analysis—this being presumably the intention of the author. The same remark applies even more aptly to the chapter on quantitative analysis, in which Liebig's method for the determination of urea is not referred to; the hypobromite method being given as more convenient. The remainder of the volume is occupied by the space devoted to the examination of urinary sediments: each being classified under "microscopical character," "chemical character," and "occurrence."

We find, further, an analytical scheme for the study of calculi, taken from Witthaus's "Guide;" and, lastly, a description of the apparatus and reagents necessary to conduct the tests detailed in the body of the work.

Holland's is a still smaller book than the preceding in the number of pages contained, though the type is often not so large. It consists of "memoranda, chemical and microscopical, for laboratory use," and is by far not so complete as Jenning's "Guide." The covers are hinged to open at the top, and only one side of each leaf is printed; thus affording opportunity for the insertion of notes. The arrangement of the book is quite different from that of the other two; qualitative and quantitative analysis being united with microscopical examination, and with occasional notes on "import," in the discussion of the various constituents of the urine. After a few remarks on color, odor, reaction, and specific gravity, with the approximate determination of the total solids present, the study of the inorganic ingredients is discussed very briefly, and this followed by the consideration of the normal and abnormal organic substances of the urine; though "bile" receives less than a dozen lines under "color." Serum albumen is the only one of the albuminous bodies considered, but sugar is more fully treated. Acetone and diacetic acid are wholly ignored. The book contains, in addition, a short method of procedure for the analysis of urinary concretions. The illustrations, which are numerous, are well executed, and superior to those seen in many of the smaller books of this class. J. P. C. G.

ANATOMY, DESCRIPTIVE AND TOPOGRAPHICAL, IN 625 ILLUSTRATIONS. By CARL HEITZMAN, M.D. English edition by LOUIS HEITZMAN, M.D. 8vo. pp. xxii., 308. New York: J. H. Vail & Co., 1887.

THE title expresses exactly the purpose of this book. It consists essentially of illustrations explained by brief references in the text and

covering the whole field of human anatomy. Of these plates both as to accuracy and artistic skill it is difficult to speak too highly. Those on the organs of sense are especially good and clear, and the number of sections make the work more than ordinarily valuable. As a novelty, in such works at least, we notice also plates giving the directions of the hair and of the cleansings of the skin which direct attention to a matter too little studied.

We are not sorry too see so many Latin names retained in the plates, as familiarity with these classical names we fear is becoming a lost bit of scholarly attainment on the part of many of the younger members of the profession. In view of the paucity of the text we should much fear that the book will scarcely ever become a favorite with American students, but those who do purchase it will have no occasion to regret it.

W. W. K.

HANDBUCH DER OHRENHEILKUNDE: FÜR AERZTE UND STUDIRENDE. Von DR. WILHELM KIRCHNER, Docenter der Ohrenheilkunde an der Königl. Universität in Würzburg. Zweite Auflage. Mit. 41. Abbildungen in Holzschnitt. Pp. 218. Berlin: F. Wreder, 1888.

MANUAL OF AURAL THERAPEUTICS, FOR PHYSICIANS AND STUDENTS. By DR. WILLIAM KIRCHNER, Instructor in Otology in the University of Würzburg.

THIS is Vol. XI. of Wreder's series of short medical treatises. It belongs to that class of books which may be called the contradictory or useless class. Because, while professing to be for physicians (not specialists) and for students, who are supposed to know even less than the general physician, books of this kind do not give any anatomy or physiology, needed so greatly by the class the book is professedly prepared for, yet enter largely into special forms of treatment, with their imposing paraphernalia of instruments, and even describe operations like tenotomy of the tensor tympani, which is not easily performed by an expert. How can such a book be of value to a medical student, or even to a general practitioner? It, of course, calls attention to the writer as one fully prepared to treat the diseases which the book discusses.

The few anatomical figures which are given are almost invariably very poor, and even erroneous—like, for example, Fig. 1. The instruments represented are clumsy and old-fashioned, the improved ones, like the polypus snare with the wire concealed in the barrel, being omitted entirely. We regret to feel forced to say that we cannot see why such books are issued, nor what good they can accomplish after they are published, excepting to advertise the author and the publisher. The short chapter on "Simulation" is good, but not original. C. H. B.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Hypodermatic Injection of Quinine.

The discovery of a suitable preparation of quinine for subcutaneous injection has occupied the researches of many, but with moderate success. In the issue of the *Bulletin Général de Thérapeutique* for March 15, 1888, Drs. de Buermann and Villejean present a tolerably full historical account of the salts of quinine with reference to their solubility. They find that the neutral hydrochlorate possesses the quality in a higher degree than any other salt.

The requisites of a quinine salt to be used for subcutaneous injection are, 1st, that it be dissolved in a sufficient quantity of water within the capacity of the ordinary syringe, and 2d, that it be free from any irritant quality that may set up local inflammation. These requisites are supplied in the neutral hydrochlorate of quinine.

In the table prepared by the authors of the paper, the following figures are given:

One part of neutral hydrochlorate of quinine is soluble in	0.66	of water.
One part of neutral sulphovinate in	0.70	"
One part of neutral bromhydrate in	6.33	"
One part of neutral sulphate in	9.00	"

On the Treatment of Typhoid Fever.

In the last issue of *Centralblt. für die gesammte Therapie* for March, 1888, there is an abstract of a paper in which Ziemssen, amongst other measures, discusses the action of calomel administered with the view to destroy the infection and to lower the temperature. This practice is entitled by our German colleagues the "specific," and consists in giving calomel in three doses of eight grains each every two hours. It causes the greenish or spinach-colored stools known as "calomel stools," and the temperature falls, often to normal, and this reduction may last twelve hours. Ziemssen holds that the

germicide action is due to the formation of a minute quantity of bichloride of mercury. The specific method does not shorten the duration of the fever, but its subsequent course is milder.

The Treatment of Phthisis by Subcutaneous Injection, and Inhalation of Sulphurous Acid Gas.

Dr. Dariex proposes to administer sulphurous acid in the treatment of phthisis, by modes that secure the most rapid and effective action (*Bull. Gén. de Thérap.*, etc., Feb. 29, 1888). After an historical preliminary, in which we see no reference to the investigations of Dr. Dewar, of Scotland, which appeared several years ago, the most notable that have been made, our author gives an account of his method of preparing the gas, of its effects, and its applications in the treatment of consumption.

An increase of the body-weight is soon effected. During the first few days the expectoration becomes liquid and copious, the sputa proper bearing a small proportion to the watery fluid; but after four to six days a considerable diminution in the amount is noted, and the expectoration becomes much easier. A marked lessening in the oppression is observed, and this is the more decided when the remedy is administered subcutaneously. Appetite improves, sleep becomes more sound and refreshing, and the sweating lessens and sometimes disappears.

As respects the physical signs, it is observed that the *râles* lessen in amount as the expectoration declines, and all the other signs proportionally diminish. The bacilli seem to escape injury, but they decline in number as the quantity of expectoration diminishes.

The conclusions reached by Dariex are:

1st. That sulphurous acid gas is not a specific for phthisis in the sense that the iodides are for tertiary syphilis; but it has considerable power to retard the progress of the changes in the lungs and to lessen the severity of the symptoms. When given in suitable cases, cough and expectoration lessen, the sweats disappear, and an increase in weight takes place.

An ingenious method of preparing sulphurous acid for inhalation is that proposed by M. Deschiens (*Bull. de Thérap.*, Feb. 29, 1888). It consists of an iron vessel to hold the sulphur, with an aperture at the bottom, having a regulating screw to control the amount falling on the heated plate.

Strophanthus in Typhoid Fever.

Dr. V. Poulet publishes a paper (*Bull. Gén. de Thérap.*, Feb. 29, 1888) on the use of strophanthus in typhoid fever, in which he ascribes remarkable, indeed, surprising powers to this agent. "The results obtained," he says, "are truly marvellous." He narrates three cases to illustrate the character of the effects produced. He finds it an *incomparable antithermique*, or antipyretic, reducing the fever heat two or three degrees, and maintaining the reduction. He also regards it as an effective agent in the hemorrhage of typhoid, disagreeing in this respect with Dr. Emil Pins, of Vienna, who maintains, on theoretical grounds, that it is dangerous. The preparation used by Poulet is the extract.

Oxynaphtoic Acid.

In the issue of the *Archiv für experimentelle Pathologie und Pharmacologie* for Feb. 29, 1888, von Hofmeister publishes a paper on the physiological actions of this new artificial product. He finds it to be an excellent antiseptic—stronger than carbolic acid or salicylic acid. It does not act on pepsin sufficiently to impair its ferment property, and can, therefore, be given freely by the stomach.

The combination of the acid with sodium is a salt having ready solubility in water, and general properties corresponding to those of its congeners. It is antiseptic, antipyretic, and a germicide as applied externally in parasitic skin diseases. Our author promises further information.

The Value of Hypodermatic Injections of Eucalyptol and Iodoform in Phthisis.

Much work has been done in the hypodermatic treatment of phthisis. The more recent experiences are stated in a paper by M. Edmond Habert (*Revue de Thérap.*, March 15, 1888). Eucalyptol is dissolved in vaseline oil (75 grains to 300 grains). Sometimes iodoform is mixed with it; more frequently alone in the same solution. In this way Habert has used daily from 6 to 15 grains of eucalyptol, or the same quantity of iodoform.

The general result may be stated as follows:

In incipient cases the cough is loosened, and the expectoration is changed in character and much diminished in amount; but the bacillus does not disappear. In cases of advanced tuberculosis, no considerable benefit is derived in any case.

Flour of Sulphur in Sciatica.

The extraordinary statement is made that the topical application of sulphur, in powder, is a highly effective remedy for sciatica (*Revue de Thérapeutique*, etc., March 15, 1888). Several years ago Dr. Henri Guéneau Mussy brought it to the attention of the Therapeutical Society, and recently Dr. L. Duchesne has reported successful cases thus treated.

The method consists in applying very freely flour of sulphur to a bed-sheet and then wrapping the affected member in it, allowing it to remain for the night. It is said that one night suffices to cure. Duchesne narrates a case of long standing, and of great severity, in a woman of forty years, who was cured by one night of the sulphur thus applied.

That the sulphur penetrates the system is shown by the fact that the urine in a short time smells strongly of sulphuretted hydrogen.

The Subcutaneous Use of Methylal in Delirium Tremens.

Krafft-Ebing, the eminent alienist, has recently (*Therapeutische Monatshefte*, February, 1888, page 55) reported the results of the use by subcutaneous injection of the new hypnotic—methylal. He illustrates the action by numerous cases. In general terms, he concludes that this agent is more useful in asthenic conditions, and is not so effective when cerebral hyperæmia exists. The sleep caused by it is similar to natural sleep, and no important

or unpleasant after-effects are experienced from it. Krafft-Ebing finds it the best remedy for delirium tremens now in our possession.

The preparation used by him is a solution in distilled water, and the dose from one-half a grain to two grains, used subcutaneously.

Anthrarobin—a New Remedy for Skin Diseases.

The chemical characteristics of the new remedy, anthrarobin, were set forth originally by Prof. Liebermann, but the first study of its physiological actions was made by Jaffé and Darmstädter. It has similar properties to chrysarobin and pyrogallic acid; but it is less active than the former, but is stronger than the latter. The following are formulæ proposed by Behrend (*Therapeut. Monatshefte*, March, 1888, p. 101):

Anthrarobini	10 parts.
Ol. olivæ	30 "
Lanolini	60 " —M.

Ft. ung. 10 per cent.

Anthrarobini	10 parts.
Alcohol	90 " —M.

Anthrarobini	10 parts.
Boracis	8 "
Aq. destil.	80 "

He has used anthrarobin with success in psoriasis, herpes tonsurans, and other parasitic skin diseases.

Amylen Hydrate as a Hypnotic.

Increasing experience confirms the first reports on the hypnotic power of amylen hydrate. Dr. Gürtler, of Königsberg (*Berliner klin. Wochenschrift*, No. 6, 1888), gives the results of its use in cases of alcoholism, epilepsy, morphinism, cerebral meningitis, spasmodic cough, cystitis, and other maladies. In these and other diseases he has found it to act promptly and efficiently as an hypnotic.

The formulæ advised by Gürtler are as follows:

Amylen hydrat.	7 parts.
Aquæ destil.	40 "
Syrp. rubi	30 "

or,

Amylen hydrat.	7 parts.
Aquæ menth. pip.	40 "
Syrp. rubi	30 "
Ol. menth. pip.	gtt. 1

Dose.—45 to 90 grains of amylen hydrate for an adult.

Salicylic Acid and Salol in Acute Rheumatism.

Aufrecht has made some observations on the comparative value of salicylic acid and salol in rheumatismal diseases. He decides that salicylic acid is the more effective in the acute, and salol in the chronic forms.

Tribromphenol.

A new substitution product, in which bromine and carbolic acid are combined, has recently been added to the very numerous agents already before the medical profession (*Deut. med. Wochen.*, quoted in *Therapeut. Monatshefte* for March, 1888).

Dr. F. Grimm finds tribromphenol an efficient antiseptic in skin diseases. It is slightly soluble in water. It is not irritating to the skin. Topically, it is an efficient application to wounds, to atonic granulations, and strumous ulcers. It is an efficient antiseptic, and unirritating topical remedy in catarrhal affections of the mucous membranes. It remains to be shown how effective it is as a poison to bacteria.

Although fitted especially for topical use, it promises well as an internal remedy in affections of the stomach and intestine.

MEDICINE.

UNDER THE CHARGE OF

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Weil's Disease.

Fiedler (*Deutsch. Arch.*, B. 42, H. 4, 281) devotes some attention to the study of the febrile affection described by Weil in 1886, and since then discussed by Goldschmidt, Aufrecht, Wagner, Roth, and Haas, making a total of twenty cases. He then reports twelve more instances of the disease, which he has observed during the past eleven years, but which he was hitherto unable to classify. He does not believe that it is an abortive form of typhoid with icterus, as Weil has suggested; since, in an experience of about 5000 cases of typhoid fever, he has never seen a case beginning with severe general symptoms and chill develop icterus with swelling and tenderness of the liver on the second or third day, and then on the eighth or tenth day be completely free from fever, and convalescent. The author further emphasizes, as distinguishing it from typhoid, the pain in the muscles, especially in the calves; the typical temperature curve; the absence of catarrh of the lungs, the rapidity of the pulse, and various other symptoms.

After an extended discussion of the disease he draws the following conclusions from his own observations:

1. The disease first described by Weil in 1886 is an acute infectious or toxic affection, which has nothing in common with typhoid fever, or any other disorder. It is a morbus sui generis.

2. The disease begins quite suddenly, without prodromal symptoms, often with a chill.

3. Symptoms always present are: fever, headache, evidences of gastric disturbance, jaundice, and muscular pain (especially in the calves).

4. The fever has a typical course, and lasts eight or ten days. Sometimes, after the fall of temperature, which occurs by steps, a relapse of the fever is seen. The pulse is at first frequent, later subnormal.

5. The spleen and liver are commonly swollen, but not always; the latter is often tender on pressure.

6. Nephritis is often observed in this disease.

7. Herpes and erythema at times occur.

8. The disease has, in general, a favorable prognosis.

9. It attacks chiefly the male sex at the prime of life, and develops usually during the hot season of the year.

10. The cause of the disease is still entirely unknown; though the circumstance, that out of twelve male patients nine were butchers, makes it probable that butchers are more especially liable than other persons to be attacked by the agencies which produce the affection.

Acromegalie.

Erb (*Deutsch. Arch.*, Bd. 42, Heft 4, 295) contributes an elaborate illustrated article on this very rare affection, which has been described under various names. He reports a new case of the disease with the greatest care, and gives tables of the measurements of numerous parts of the body, of the electrical reactions of various nerves, etc. He also details the subsequent history of the 2 cases described by Friedreich twenty years ago, and adds synopses of all the cases which have been hitherto published; in all 11 including his own.

In comparing these 11 cases we find that there have been 8 men and 3 women affected. All classes are liable to it, though it seems to attack the lower classes most especially. At any time of life, too, the disease may make its appearance. Thus, in 3 instances it was first noticed under twenty years, in 3 when between twenty and thirty, in 3 from thirty to forty, in 2 from forty to fifty. The development of the affection is slow and creeping. The initial symptoms which precede or accompany the enlargement of the extremities and the head are in most cases not very pronounced; consisting in a sense of weakness and tire, drowsiness, paræsthesia, and headache; and in some cases severe attacks of migraine, pain throughout the whole body, etc. The most striking symptom in all cases is the advancing enlargement of the extremities, particularly the colossal development of the hands and feet. The legs and forearms, especially in the region of the ankles and wrists, partake in the enlargement, as does the face, though chiefly in the lower part. The cause of the enlargement, is found in an overgrowth of the bones themselves, especially in their breadth and thickness. The skin is involved to only a slight extent, and never shows any thickening as in elephantiasis or myxœdema. Bones, other than in the extremities, are sometimes attacked—*e. g.*, the ribs, sternum, clavicles, and not seldom the vertebral column, which becomes curved and thickened. The bones of the face are almost always

affected, particularly the lower jaw and the cheek bones. The thickening of the under lip, nose, and tongue is also almost constant. Enlargement of the ears, eyelids, larynx, and epiglottis is noted in some cases. Thickening of the femur, humerus, and scapula is rare, but the patella is almost always involved.

Among inconstant symptoms may be noticed, enlargement of the heart with asthmatic affections, albuminuria, thirst, weakness of the muscular system, disorders of sight, headache, diminution of intelligence, etc. Perhaps an important symptom is the affection of the thyroid, seen in 8 cases, in 6 cases it was atrophic, and in 2 hypertrophied. Finally, in 3 cases dulness in the upper sternal region probably indicated an enlarged thymus.

The course of the disease is slow, though sometimes rapid at first. It may slowly lead to death through some complication of the internal organs—probably an integral part of the disease—or it may remain stationary for decades.

The diagnosis is not difficult, as the disease is so well characterized. In *elephantiasis* the tissues of the skin are very much thickened and œdematous. In *myxœdema* the quality of the skin is very characteristic; turgid and swollen without being œdematous, partly pale, partly cyanotic. The face has a stupid expression, and is rounded instead of being oval, as in acromegalie; particularly is there no widespread hyperostosis. *Leontiasis ossea*, of Virchow, affects especially the bones of the skull, producing irregular bony tuberosities, and making a monstrosity out of the head. The extremities are uninvolved. In *osteitis deformans*, of Paget, the painful enlargement of the long bones is irregular, not symmetrical; and there is no enormous development of the hands and feet. Many cases of *arthritis deformans* resemble acromegalie superficially, but the latter disease has no true deformity of the joints, no tenderness, no grating, no exudate, etc.

Autopsies have been made in 3 cases, the following being the most important conditions noted: Widespread hyperostosis of the bones, and a tumor of the hypophysis cerebri in all 3 cases. In 2 cases there was hyperplasia of the brain, of the sympathetic and cerebral nerves, and in part of the spinal nerves. The thyroid and the spleen were enlarged in 2 cases, and the thymus in 1 case.

Erb concludes that the nature of the disorder is a hyperplasia of the most diverse tissues of the body; first of all, of the connective tissues, best seen in the bones. There is also hyperplasia of the brain and nerves, always this change of the hypophysis, certain alterations of the thyroid, and persistence and hyperplasia of the thymus. It seems clear that this widespread tissue growth must be an irritative process, and the question arises whence the irritation comes. It might be from outside—chemical or bacteriological in its nature; but this does not seem at all probable. The irritation might, on the other hand, be from within the body, either a tropho-neurotic influence from the diseased brain, nerves, sympathetic or hypophysis; or a chemical product irritating to the tissues, and derived from some disease of the large glandular organs of the abdomen; or, finally, a sending out by the persistent and enlarged thymus of tissue elements endowed with unusually great plastic energy. Erb discusses all of these hypotheses in detail, but concludes that

none of them is satisfactory, and that the etiology of the disease is still completely in the dark.

As little is to be said of the therapy. Alterative drugs would seem to be indicated in the early stages, but tonic treatment will as often be called for, on account of the initial weakness and nervousness. In more advanced cases that medicine must be chosen which seems best to suit the individual case, and more than this cannot be said in the present state of our knowledge.

Friedreich's Ataxia.

Three cases of this interesting disease are recorded by Dr. G. B. Shattuck (*Boston Med. and Surg. Journ.*, February 16, 1888), one of them having come under his personal observation. This case, a boy, fourteen years of age, exhibited the first symptoms when eight years old. At this time he began to stumble when walking, and his gait was unsteady. The disease steadily advanced; affection of speech appearing when about twelve years old. Examination showed a well-nourished, intelligent boy exhibiting a markedly ataxic gait, ataxic movements of the hands, slight oscillations of the head, slight tremor of the tongue, and a jerky and ataxic speech. The knee-jerks were absent, plantar reflexes present, sensibility of the legs slightly diminished, and transition a little delayed. There was no atrophy or loss of muscular power, and no nystagmus. Lateral curvature of the spine was present. The parents are healthy, and there is a total absence of a history of nervous disease in the family connection. There were ten children in the family, and of these a brother of the patient, now twenty-four years old, began to exhibit slight unsteadiness in his gait when seven years old, and has now entirely lost the use of his lower limbs. A sister ten years old first complained of weakness, with palpitation of the heart, when five or six years of age; developing an awkward gait at the same time. She has also a curvature of the spine.

Ormerod (*Brain*, January, 1888, p. 461) reports several cases additional to those he published a few years ago. One of these is, he admits, a doubtful case, as she presented, at the time of examination, but few evidences of Friedreich's ataxia, while some of the symptoms—as a spastic condition of the lower limbs, with increased patellar reflex and ankle clonus—contraindicated the existence of the disease. Two other patients were undoubted instances of it. These were children of the one first mentioned, and possessed a history of nervous disease in the antecedents, extending further back than the mother. The first, a man aged twenty-two years, was attacked three years before by the first symptom, an unsteady gait, appearing after some sort of fever. At the last examination he presented decided ataxia of the lower limbs with well-marked Romberg's symptom; no affection of the upper extremities; nystagmus; rather indistinct speech; no affection of sensation except a feeling as of a sponge under the feet, and no atrophy or paralysis. In the second case, the sister of the last, aged twenty-nine years, the affection of the legs dates from the age of five years, and increased greatly after scarlet fever at seventeen years; at which time the hands and speech also became involved. At the last examination made there was inability to walk; paralysis of the lower limbs with some atrophy; marked ataxia of the hands; nystagmus; slow, drawling, indistinct speech; no patellar reflex; no disturbances of sensation. There

was also a peculiar expressionless appearance of the face. The patient has severe attacks of vomiting at times, as well as certain other sensations which she describes as "choking attacks." In a third patient, a female, though there was no other case in the family, and no history of nervous disease, the father was a drunkard. The first symptoms developed at about the age of sixteen or seventeen years, resembling chorea in some respects. When last examined she exhibited marked ataxia of the legs, inability to walk except when supported; Romberg's phenomenon, some deformity of the left foot, bluish congestion of the feet, ataxia of the hands, possibly some nystagmus, very slight affection of speech. There was no atrophy, no affection of sensation, no knee-jerk. In discussing the subject, Ormerod lays great stress on the influence of heredity in the broad sense of "family proclivity," though he refers to some cases in which direct similar heredity existed. He is, moreover, inclined to believe that intemperance in the parents or more remote ancestors is a predisposing cause, yet he admits the force of the objections against it. Acute febrile diseases also appear to play an important part in some cases. Deformity of the feet is quite frequently observed in the disease.

JOFFROY, in the *Bulletin Médical* of February 26, 1888, reports the latest case of which we have heard. The patient was a boy, aged nineteen. There is no antecedent history of nervous disease in the family. The father died of tuberculosis, and the mother probably of the same malady. One child, a sister, exhibited symptoms of Friedreich's ataxia at twenty-two years of age; the disease lasting fourteen years, and the subject finally dying of tuberculosis. The patient himself showed the first evidences of the affection in the legs at the age of ten years, and at fourteen had an incoördinate gait, with frequent falls. At fifteen years the upper limbs were involved, and affection of speech and scoliosis developed. When examined at nineteen years of age, he exhibited a gait like that of a drunken man; impossibility of walking in the dark; Romberg's symptom; exaggerated plantar, but abolished patellar reflexes. The cutaneous sensibility and the muscle sense of the lower extremities were unaffected. There was a tendency to talipes equinus, and to contraction of the extensors of the toes. The upper extremities were somewhat ataxic, and this was increased by excitement. There was a scoliosis to the right in the dorsal region. The right arm was decidedly weak and the muscles somewhat soft, while the electrical contractility was diminished. The speech was slow and drawling; there was partial paralysis of several of the muscles of the face, including the elevators of the eyelid. There was no alteration in the eye-ground, though the visual fields were somewhat contracted. The head did not oscillate; the intellect was unaffected. The author then discusses briefly the disease in general, and points out its points of likeness to and difference from locomotor ataxia and disseminated sclerosis. A good, though not complete, bibliography is appended.

ACUTE ASCENDING PARALYSIS.

FÉRÉ (*La Semaine Médicale*, 1888, p. 73) reports a case of this disease in a man of forty-one years, of good family history, and in whom there was no discoverable cause, unless it be that he had for some months been very laboriously occupied. He was attacked by extreme weakness in the four

limbs, without alteration of the cutaneous sensibility or of the muscle sense, and without pain. The pulse was 130, and on the next day became 200, while the temperature did not exceed 38° C. [100.2° F.]. The paralysis progressed rapidly, and caused complete abolition of all voluntary movements, with absence of the patellar reflex. Deglutition and micturition were not affected. An electrical examination showed that the faradic contractility of the muscles of the limbs and trunk was totally lost. Death occurred from suffocation six days after the onset of the disease.

The Treatment of Sleeplessness.

Eccles (*Practitioner*, March, 1888) describes the various methods which he has employed during the past two years to produce sleep. Massage is a very valuable means of treatment to restore the *habit* of sleeping; but the object of this paper is to describe, outside of narcotics, the means used to produce an immediate effect. These means have been long and familiarly known, but their respective applicability to different disorders of sleep does not seem to be so well understood; and it is true that those which are adapted to one class of cases, may be useless or even harmful to another class. Patients who "constantly dream" and have but restless unrefreshing sleep, are often treated in various ways in the effort to overcome the partial functional activity of the brain. The best treatment is probably a hot bath taken immediately before the individual wishes to settle quietly for the night. To make it successful it is necessary that even the petty details be attended to. The room should be of a temperature of not less than 65° F., and the patient should be stripped and the head then douched with water at 100° F.; this chilling of the surface and heating of the head filling the brain with blood. The whole body of the patient, excepting the head, is then immersed in a bath of 105° to 110° F. for eight to fifteen minutes; then wrapped in blankets, taken to the bedroom, dressed in night clothes and put to bed with a hot bottle to the feet and the head well raised. In this way the *whole of the brain* undergoes a reduction of blood supply, and dreaming is prevented. The contra-indications to the hot bath are extreme emaciation or anæmia, atheroma, and aortic valvular disease. In these conditions a stimulant rather than a depressant to the nervous system is required, and Brunton has, therefore, recommended strychnia as a hypnotic.

Where there is organic heart disease or functional weakness of the heart and circulation, general corporeal massage at night will frequently produce sleep, particularly if precautions be taken that the surface of the body be not chilled. In certain other cases of insomnia depending on an overwrought and enfeebled nervous system there is hyperæsthesia, and vigorous kneading cannot be employed with benefit. In these instances general stroking of the back and limbs must be substituted; or gentle kneading of the abdomen, followed by a hot abdominal compress. This compress consists of two bandages four yards long, and one and a half yards wide; heated dry in a hot oven, and brought to the bedside in a covered jar. The end of one of them is dipped in water for as much of it as is necessary to cover the abdomen, applied to the surface, and the rest of the bandages wound around this. In still other cases of insomnia from prolonged overwork, mental distress, the morphia

or chloral habit, etc., a condition appears in which massage of any sort applied in the evening must be omitted, since it only tends to increase the nervous excitement. Prompt action is necessary, yet drugs are useless. Under these circumstances there is no agent so useful as the wet pack carefully administered. The patient should remain in it twenty minutes to half an hour, and then, on opening the pack, should be quickly clothed in previously warmed night-clothes, and well covered in bed. Where the action of the pack is very rapid and transitory, its coverings should be sooner and more gradually removed, and the patient not allowed to become too warm in it.

By some one of these methods, followed by recumbent rest in bed, and absolute quiet, sleep may almost invariably be produced. The action is, however, only temporary, and for permanent restoration some other and radical treatment is required. Continued recumbent position in bed in a quiet room, away from social, business, or domestic cares, a carefully modified diet, and massage properly applied will, in the majority of cases, at last be followed by the happiest results.

The Anatomy and Physiology of Stomatitis Aphthosa.

E. Fränkel (*Centralblatt f. klin. Med.*, No. 8, 1888) says that the etiology of aphthæ has been a subject of much discussion. The disease is supposed to be due to the previous formation of vesicles, to the deposition of a fibrillated subepithelial exudate, to a fibrinous exudate in the upper layers of the mucous membrane, and finally, to a necrosis and maceration of the epithelium. It seemed, therefore, best to reinvestigate the subject, and for this purpose the author employed four cases of aphthæ; three of which were in adults, one in a child. The ulcers after being excised, hardened, cut and examined microscopically, showed that all those elements were comprised in them which are characteristic of the fibrinous pseudo-membrane, as seen especially in diphtheria; and that we are, therefore, to regard the process as pseudo-diphtheritic in the sense of Weigert.

In this pseudo-membrane are found epithelial cells with the evidences of coagulation-necrosis, numerous leucocytes, and fibrin. It is formed at the expense of the dead epithelial cells and lies *upon* the true mucous membrane, and it is on this account that no cicatrix develops. Regarding the etiology of the affection, bacteriological investigation carried out in different ways shows that there are micrococci in the aphthous foci, consisting solely of the *staphylococcus pyogenes citreus*, or of *staphylococcus pyogenes flavus*. It seems probable that these microörganisms are the true cause of the morbid process, by their invasion and destruction of the epithelium. Other factors, such as dentition, gastric disturbances, acute exanthemata, etc., are only predisposing causes.

Dicrotism of the Pulse in Insufficiency of the Aortic Valves.

Geigel (*Deutsch. Arch.*, Bd. 42 Heft 4, 391) reports an interesting case which shows that the presence of dicrotism in a compound valvular lesion is no proof that the aortic valves are not affected. The patient when first examined exhibited typical signs of pure aortic insufficiency, and her sphygmographic pulse-tracing was that characteristic of this affection. Later a

fresh endocarditis developed, and then the signs of mitral regurgitation. A new tracing now revealed the presence of distinct dicrotism. The author explains this in the following manner: In simple aortic insufficiency the contraction of the arteries drives the blood back into the empty, dilated, and yielding left ventricle, and there is consequently no secondary pulse wave, or, at most, only a suggestion of one. If now the mitral valve becomes insufficient, the left ventricle drives a considerable portion of its blood during the systole into the auricle. The greatly distended and over-filled auricle then returns this at the very beginning of the diastole into the ventricle, and the ventricle, now on its part fully distended, offers a resistance to the mass of blood tending to regurgitate from the aorta. The secondary pulse-wave is, therefore, again produced, just as though the aortic valves were sound. It was interesting to note in the case reported that the endocarditis appeared later to heal, while the systolic murmur and the accentuated pulmonary second sound disappeared. A pulse tracing taken at this time showed the absence of dicrotism as when first examined.

Physiological Variations in the Shape and Position of the Liver.

Symington (*Edinb. Med. Journ.*, February, 1888) pursued a careful investigation of this subject by making frozen sections; and after a full discussion of it, illustrated by plates, draws the following conclusions:

Distention of the stomach causes certain definite alterations in the shape and position of the liver. The movement of the organ is a complicated one; but may be roughly described as a rotation around a vertical axis passing through the inferior vena cava. The left lobe and the anterior part of the right lobe undergo the greatest displacement. The suspensory ligament is relaxed and thrown into folds when the stomach is empty, but when it becomes filled, the liver glides to the right, and the ligament is made tense, and thus checks excessive motion of the organ. The round ligament and the left lateral ligament assist in confining the movements of the liver within a certain range. The vena cava and the Spigelian lobe are moved but little, if at all. It is probable that the gliding of the anterior surface of the liver toward the right side is associated with a corresponding backward movement of the right surface. Whether the stomach be empty or full, the liver always retains its general form, which is that of a triangular prism. The transverse diameter is, however, considerably diminished, and the vertical extent on the right side increased by any distention of the stomach. This increase in a vertical direction is the natural result of the compression of a plastic mass like the liver between a distended stomach and the right lateral wall of the abdomen.

On the Occurrence of Rhabditides in the Urine in Hæmaturia.

Scheiber-Stuhlweissenburg has described a microscopical round-worm—*rhabditis genitalis*—found in the urine of a woman, and seeming to come from the genitals, and not from the urinary tract; and Baginski last year reported a case of paroxysmal hæmoglobinuria in a child of three and a half years, in which the urine contained a peculiar worm, which Virchow stated was this rhabditis form of nematode. He was of the opinion that there was

an etiological connection between the attacks of hæmoglobinuria and the presence of the worm.

PEIPER and WESTPHAL (*Centralblatt f. klin. Med.*, No. 8, 1888) describe another case of the same nature. A boy of nine and a half years, rather weakly, had had nocturnal enuresis frequently for two years. One month previously he had suffered from pleurisy; then suddenly developed a severe hæmaturia, a month later a second attack of hæmaturia developed, and three days after its onset an examination of the urine revealed the rhabditides, in addition to red and white blood cells and blood casts. The parasite much resembles the trichinæ, though smaller, but careful investigation showed it to be rhabditis. Examination of the blood, feces, and preputial secretion revealed neither parasites nor eggs. Although admitting the possibility of a connection between the occurrence of the parasite and the hæmaturia, the authors do not venture to assert it, and state that further researches must be made before this can be determined.

SURGERY.

UNDER THE CHARGE OF

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STERILIZED DRESSINGS.

DR. SCHLANGE describes at some length (*Archiv für klinische Chirurgie*, vol. xxxvi., 1888) a series of experiments which led him to the conclusion first, that ordinary dressings thought to be aseptic are not so, but contain various species of germs, and next that the antiseptic action of many, if not all of these dressings, believed to result from the liberation in the wound secretions of the material with which they are impregnated, is no less unreliable. The majority of his experiments were made with sublimate dressings and appeared to show that when freely mixed with blood or albuminous fluids much of the antiseptic action was lost. There are, of course, certain methods by which dressing materials can be rendered absolutely free from bacteria; soaking in boiling water or in a sufficiently strong sublimate solution will effect this at once, and if we apply over a wound materials taken directly from boiling water or from the sublimate solution, and still wet, we may be sure we have put on a truly "aseptic" dressing. The disadvantages of the wet dressings are numerous, however; among them being the interference with the evaporation of the wound secretions and the tendency to produce eczema, and they should be reserved for special cases.

For routine employment we must depend on dry dressings. If, however, the wet sublimate gauze is taken, the layers separated from each other, hung up to dry, cut into the required sizes, rolled, etc., in every case infectious germs

may be found afterward. For these reasons, in von Bergmann's clinic, impregnation of the gauze with sublimate has been discarded and dependence is placed entirely upon gauze sterilized by steam. The raw material, cut of proper sizes and lengths, is put in a wire basket, exposed to superheated steam in an oven for an hour, then removed, and, after drying for a minute, the basket, with its untouched contents, is put in an iron cylinder from which the gauze is withdrawn as required. This secures, with the minimum of handling, an absolutely germ-free material under which wounds do admirably.

Schlange thinks that the excellent results formerly ascribed to the antiseptic action of sublimate are really due to an entirely different cause—the speedy and undisturbed evaporation of the wound secretions. By another series of experiments he has shown that interference with the evaporation of these secretions and the development of germs are intimately associated, and that the latter disappear when the "drying out" process is complete. While decomposition of the blood or discharges in a sterilized aseptic dressing is only possible through the action of germs alighting on its surface, it does not follow that such a dressing should be changed merely because the day after an operation the superficial layers become blood-stained. If by attention to the patient's position, etc., evaporation is favored no risk is ordinarily run. If, on the contrary, there is great soaking of the dressings the superficial layers should be changed, but the deeper layers if they have begun to dry out should be left undisturbed.

E. Laplace (*Centralblatt für Chirurgie*, Feb. 18, 1888) examined a number of dressings containing two and a half, three, and four per cent. of sublimate, to determine whether or not they were aseptic. In 300 specimens of wood-wool only seven were not sterile, and all of 100 specimens of sublimate gauze were free from germs. He then investigated the antiseptic action of the same dressings, concluding that not only these but many others were unreliable, and that the good effects following their employment were largely due to the fact that they were aseptic when applied. His experiments showed that the germicidal action of the sublimate solution was satisfactory with non-albuminous fluids or discharges, but with albuminous fluids, like blood serum, there was a precipitate of albuminate of mercury which left the solution inert. A mixture of equal parts of 1 : 1000 sublimate solution and 5 : 1000 solution of hydrochloric or tartaric acid prevented this result, and decomposing human blood, which was unaffected by the ordinary sublimate solutions, became absolutely sterile when treated with this mixture. He then tried it on a number of clinical cases with equally good results, arriving, finally, at the following conclusions: 1. We possess in the tartaric acid sublimate mixture a thoroughly satisfactory material for the disinfection of wounds. In order to obtain its good results infected wounds must be washed daily for at least from ten to twenty minutes. In the treatment of fresh wounds a single washing and irrigation suffices. The solution for irrigation should consist of sublimate 1 part, tartaric acid 5 parts, distilled water 1000 parts; for impregnating the gauze, sublimate 5 parts, tartaric acid 20 parts, distilled water 1000 parts. 2. The sublimate dissolves more easily in the acid solution than in water, and the tartaric mixture remains incorporated with the dressings without destroying them. 3. Such dressings are thoroughly

aseptic as well as antiseptic. 4. The dressing and the solution are cheap and easily made and replaced.

A Case of Cerebral Cyst.

Mr. Kendal Franks reports (*The Dublin Journal of Medical Sciences*, February, 1888) the case of a lady, aged forty years, whose symptoms may be summarized as follows: Early in June, 1887, an epileptiform attack; recurrences of convulsions at intervals of a few days, gradually growing less intense until about the middle of July, when they were only very mild attacks of *petit mal;* 2d, a form of amnesic aphasia, appearing immediately after the first convulsion, and becoming much intensified after each subsequent fit; 3d, headache over the top of the head, corresponding to the coronal suture, and worse on the left than on the right side, coming on in violent exacerbations, increased by movements, and making it impossible to lie on the left side; 4th, cerebral vomiting; 5th, paralysis of the bladder; 6th, slight paralysis of the right internal rectus muscle; 7th, partial paralysis of the right orbicularis; 8th, paralysis of the left palate; 9th, coma, and finally death, on October 5th. The pulse throughout was variable, generally slow. The diagnosis of cerebral tumor was easy at an early stage, but its localization was difficult. There was no well-defined motor area apparently involved; no paralysis of extremities, and that of the bladder disappeared for a period of ten days shortly after it first came on. The paresis of the rectus (so slight that it was only evidenced by diplopia), and that of the orbicularis and the soft palate could lead to no definite conclusion. The aphasia was amnesic and incomplete, and could easily have been accounted for by communicated pressure. At the autopsy a large cyst cavity, measuring two inches in antero-posterior diameter, was found in the left temporo-sphenoidal lobe. The cyst was separated from the surface by a thin layer of healthy brain tissues. It was filled with clear serous fluid.

Œsophagotomy for Removal of a Foreign Body.

Dr. W. C. Frew reports (*The Annals of Surgery*, March, 1888) a case in which a piece of glass about an inch in diameter was swallowed accidentally and became impacted in the œsophagus about an inch above the sternum. Œsophagotomy was performed, and the glass removed. The patient had two recurrent hemorrhages, the last of which left him very anæmic and weak. Transfusion was then performed, twenty-four ounces of warm water containing seventy-five grains of chloride of sodium, thirty-seven and one-half grains of carbonate of sodium, and three grains of phosphate of sodium being injected into the radial vein by means of an aspirator needle, a rubber tube, and a funnel. The beneficial effect was marked and immediate. The patient made a good recovery.

Wound of the Left Ventricle.

A. P. Kiawkoff reports (*Russkaja Medizina*, No. 42) the case of a Cossack who received a dagger-thrust in the left breast. He was seen immediately afterward and was found unconscious with stertorous breathing. There was a wound one and a half inches in length in the fourth intercostal space and

in the mammary line. Free hemorrhage was taking place. The wound was cleaned, pressure applied, and restoratives administered. The following day he was conscious; pulse 90, but small; temperature 99.5° F.; cardiac percussion dulness much increased. In four weeks he left the hospital as cured. Five days later he fell dead while attempting to lift a heavy weight. The autopsy showed the skin-wound and that in the parietal layer of the pericardium as entirely healed. The pericardium was filled with dark blood. In the wall of the left ventricle was a small gaping wound a half-inch in length, with thickened edges; there was slight fatty degeneration of the adjoining muscle, and a little subacute endocarditis.

Probably in this case a little forbearance as to physical exertion would have resulted in permanent recovery. The wound had certainly healed, but the cicatrix was still so soft and recent that it could not withstand the unusual blood pressure.

Up to the present date about seven per cent. of the reported cases of wounds of the heart have recovered.

Treatment of Wounds of the Abdominal Viscera.

The very important researches of Dr. Edler, of Metz, published in vol. xxxiv. of the *Archiv für klin. Chirurgie*, are abstracted in the *Centralblatt für Chirurgie* of February 18, 1888. The author's conclusions, founded on a series of experimental researches and of collected cases—in all 868—are as follows: Laparotomy is indicated: *a*, for the arrest of hemorrhage by the ligation of large intra-abdominal bloodvessels or by the occlusion of the bleeding organ; *b*, for the removal of serious peritoneal exudations; *c*, for the opening of intraperitoneal collections of pus, or of abscesses in the viscera themselves; *d*, for the extirpation of any of the abdominal viscera.

As to wounds of special organs he concludes:

1. In wounds of the liver jaundice occurs in 20 per cent., pain under the shoulder of the right side is often marked; wounds of the convex surface are more favorable than those of the concave surface, and, with the exception of those penetrating the liver substance, they are all less dangerous than was formerly supposed. The mortality of injuries of the liver of all sorts was about 66 per cent.

2. Injuries of the gall-bladder are by no means absolutely fatal, 25.8 per cent. of the cases resulting in complete cure. Such wounds necessitate neither suturing nor cholo-cystectomy.

3. Injuries of the spleen were fatal in 70.6 per cent. of the cases. Stab wounds run a more favorable course here than the wounds mentioned above. The spleen should be removed when after subcutaneous lesions dangerous bleeding occurs, when after open wounds large vessels continue to bleed in spite of the tampon, when progressive pathological change is going on in a prolapsed spleen, and when suppuration of the organ occurs.

4. Injuries of the pancreas were associated with injuries of other organs. Escape of the pancreatic secretion has never been observed in shot wounds, and only once in stab wounds.

5. Injuries of the kidney vary greatly in their symptoms according to whether they are intra- or extra-peritoneal, but show a total mortality of 47.3

per cent., 16.5 per cent. lower than the average mortality of the whole series of visceral injuries. Extirpation of the kidney he believes to be indicated when bleeding threatens life and when suppuration is excessive, and nephrotomy has failed to give relief, contraindicated in congenital absence of the other kidney, in horseshoe kidney, and when there is a similar injury or sympathetic disease of the other kidney.

Removal of a Portion of the Liver.

Langenbuch reports (*Berliner klin. Wochen.*, Jan. 16, 1888) the successful removal of a constricted portion of the liver weighing about a pound. Owing to its hinge-like attachment to the body of the gland, and the congestive hyperplasia due to impeded circulation, it was both heavy and movable, causing intolerable distress, especially during the dorsal decubitus. The diagnosis was made by exploratory incision. The attachment was ligated in sections and the constricted portion removed. Symptoms of internal hemorrhage occurring the same evening, the abdominal cavity was reopened, the bleeding checked, the blood removed by sponging, and the wound closed. Healing was prompt, but ascites developed shortly accompanied by some general œdema. The abdomen was twice tapped, and the patient fully recovered without further mishap.

Langenbuch holds this to be the first case in which a large portion of the human liver has been removed by excision.

The Treatment of Floating Kidney.

Dr. Paul Niehaus reports (*Centralblatt für Chirurgie*, March 24, 1888) a case of floating kidney with all the usual troublesome symptoms present in marked degree. The patient was desirous of extirpation, but it was resolved to try an apparatus resembling a double truss with a vertical arm fastened about the inner third of Poupart's ligament to the horizontal band on the affected side, and carrying a pad which was applied accurately over the region beneath the costal border where the tumor appeared. The apparatus was applied while the patient was recumbent, and was removed only at night when she was in the same position. There was an immediate disappearance of the pain, indigestion, constipation, etc., and the patient was able to do housework with entire comfort. A cut of the apparatus is given.

Dr. D. G. Wilcox reports (*Annals of Surgery*, March, 1888) a case of movable kidney in a woman, aged twenty-four, who, while lifting heavily, felt something "give way in her back." She soon after detected an abdominal tumor a little to the right of and on a level with the umbilicus. She had heavy dragging pains and was much disturbed. Nephrorrhaphy was performed in the usual manner, except that the sutures seem to have been placed only in the perirenal fat and external to the capsule. The recovery was uncomplicated and the patient much relieved.

The Radical Cure of Hernia.

D. H. Petit reviews in *L'Union Médicale* of March 17, 1888, the discussion on the above subject, which took place at the last meeting of the French

Surgical Congress. Many distinguished French surgeons took part, M. Socin, of Bâle, reading the opening paper. His conclusions, and the comments thereupon, may be summarized as follows:

1. The radical cure of inguinal or femoral hernia by operative treatment is possible. MM. Trélat and Legond suggested "surgical" or "operative" cure instead of "radical," on account of the frequency of return.

2. The operation is the necessary complement of all kelotomies done for strangulation, excepting only the cases in which the intestine cannot or should not be reduced. This was concurred in by all.

3. The radical cure of non-strangulated hernia is indicated: *a*. In young subjects of both sexes (under twenty years) when the classical treatment—by truss—does not succeed in completely and absolutely holding up the hernia. *b*. In adults when the truss does not act in a similar manner. M. Socin thinks that before the age of twenty years hernia should be considered as practically congenital, as, although the hernia may not exist at the moment of birth, the condition of the inguinal and crural canals which favors it does. M. Richelot believes that it would be well to employ the radical cure in congenital hydroceles, which, of course, favor the formation of hernia.

4, The chances of success are better in proportion to the youth of the patient, the smallness of the hernia, and its shortness of duration.

5. The existence of a double hernia, or of frequent hernias in the family, diminishes the chance of success, in the sense that it shows a hernial predisposition which favors relapse, but offers no contraindication to the operation itself.

6. Bodily labor, according to M. Socin, does not tend to produce relapses; but this opinion was not thought to be correct by the majority of the speakers.

7. The employment of a truss after the operation is useless, often harmful. This was concurred in by MM. Lucas-Championnière, Léonté, and Thirias, and objected to by MM. Trélat, Legond, Richelot, and Routièr.

8. The operation is without danger in simple cases. There were reported at the congress 239 cases with 2 deaths, one from encephalitis in a confirmed drunkard, the other from pulmonary congestion in an emphysematous patient. In complicated cases we must make two classes, one in which the complication is purely local and relates to the volume of the hernia, its adhesions, etc., and another which includes aged and cachectic subjects, who in this, as in other surgical work, present the largest proportion of failures, and with whom the benefits of the radical cure do not counterbalance its dangers.

9. The operation consists essentially in the total ablation of the sac of the hernia beneath its neck. Suturing of the pillars is only exceptionally necessary.

10. In congenital hernias the dissection of the hernial sac may be difficult, but succeeds in the great majority of cases. The lower portion should be retained in order to preserve a tunica vaginalis for the testicle.

11. In case of orchitis with atrophy of the glandular structure the testicle should be removed with the sac.

The Immediate Treatment of Rupture of the Urethra.

Axel Iversen (*Nord. Med. Archiv*, vol. xx., 1888), basing his conclusions on twenty-nine cases of ruptured urethra, agrees with Guyon and Terrillon

that rupture of the urethra is frequently only partial; when complete it occurs in the lateral walls or floor of the urethra, and is most frequently situated one-third to one inch anterior to the triangular ligament in the spongy part of the urethra. The exceedingly rare cases of rupture in the membranous part are usually secondary to fractured pelvic bones. The signs of urethral rupture anterior to the triangular ligament are very different from those attendant on rupture of the membranous urethra. In the former there is a rapidly formed circumscribed perineal swelling due to extravasated blood, difficulty in passing urine, or complete retention, and urethrorrhagia. Perineal swelling is the most constant sign of this accident, and reaches its height in an hour.

In rupture of the membranous urethra the blood rarely flows from the meatus, passing backward more readily into the bladder; there is no primary swelling in the perineum. Urinary infiltration occurs almost immediately, the urine making its way in the line of least resistance through the weak pelvic fascia near the pubo-prostatic ligaments, and spreading rapidly through the subperitoneal cellular tissue. Later, suppuration may cause perforation of the peritoneum, or the pus descending by the sides of the rectum may show at the anus. Usually all external swelling is absent, and the above occurrences are to be suspected from the severity of the symptoms.

As to treatment, Iversen urges the exploration of the urethra with a small bougie-à-boule, the lip of which can readily be felt and located through the rectum. The surgeon should be content with leaving a catheter in the bladder only in the slightest cases where there is little or no swelling, and the instrument passes in without much resistance. The same remark applies to treatment by regular catheterization. In the more severe cases an incision must be made, the rent found, and a soft catheter passed through the entire urethra to the bladder. In eight or ten days it can be removed, and the patient allowed to pass his water. In the rare cases where the proximal end of the torn urethra cannot be found, a suprapubic cystotomy should be performed, when by the aid of posterior catheterization the soft instrument can be put *in situ*. If extravasation and abscess have already occurred, a catheter should not be left in the bladder, as sloughing might result.

Dr. Paoli Erasme (*Annales des Maladies des Organes Genito-Urinaires*, March, 1888) reviews the same subject in a valuble and interesting paper. He believes that in complete rupture of the perineal urethra the indications are as follows: 1st, to open a large passage for the accumulated fluids; 2d, to keep up a free flow of urine; 3d, to encourage rapid union of the two ends of the urethra and the walls of the cavity formed by the extravasation into the perineum; 4th, to prevent the formation of a cicatricial stricture of the urethra. He briefly reviews the different methods which have been recommended: Suprapubic aspiration (Lefort, Molliere) is palliative, and meets none of the indications; external urethrotomy (Guyon and others) does not provide for prompt union of the canal, and does not prevent consecutive contraction. Antiseptic measures carried out by allowing an elastic catheter to remain in the perineal wound, which is tamponed (Hueter, Löbker), or by suturing the borders of the bladder (Lucas-Championnière) produce more rapid union, but are likewise followed by urethral coarctation. The stitching of the proximal end of the urethra into the wound and catheterizing only

after healthy granulations have formed (Kœnig), while reducing risks to the life of the patient, is followed by the same results.

ERASME concludes that immediate union of the two ends of the torn urethra is the result to be aimed at; quotes the results obtained by Kaufmann, of Zurich, in experiments on dogs which were very successful, and details a case of his own in which, after a fall upon a cask, a man, æt. thirty-eight years, had a rupture of the perineal urethra. The two ends, when discovered by dissection, were separated from a third to half an inch. A large English catheter was introduced, and the two ends of the urethra brought well together with catgut stitches inserted so as not to include the mucous membrane. The transverse perineal muscles and the others which were divided were then brought together by sutures, as well as the more superficial tissues. The patient had no fever; almost no urine passed by the wound (not a drop after five days); in about seventeen days the wound was entirely healed; in three weeks a sound went easily into the bladder, no obstruction being felt, and the patient was discharged, to report for future examination.

He prefers this method of suturing to that recommended by Kaufmann, who placed his stitches first in the mucous membrane, tying them in the interior of the canal. He thinks early operations through tissues not yet inflamed or infected far preferable to those performed later, and gives the following statistics of mortality: Early perineal incisions, 8.79 per cent.; hypogastric aspiration, 19.04 per cent.; late perineal incision, 20 per cent.; and hopes that early suturing will show still more favorable results.

HYDROCELE NEONATORUM.

DR. W. WECHSELMANN (*Archiv für klinische Chirurgie*, vol. xxxvi., 1888) after a review of the subject concludes:

1. Congenital hydrocele is much more common than is usually supposed.
2. In newborn children hydroceles communicate with the peritoneal cavity with great frequency.
3. Such hydroceles are most often found on the right side.
4. They are, apparently, of intrauterine origin.

THE TREATMENT OF MAMMARY TUMORS.

MR. JOHN FAGAN, after a general review of the subject and a brief report of some cases, comes to the following conclusions (*The Dublin Journal of Medical Science*, January, 1888): 1. That in many of the very worst forms of advanced, painful, ulcerating scirrhus, where there is no immediate danger of death from marasmus or visceral complications, the part may be removed with great benefit and relief to the patient. 2. That all cases of malignant growths of the breast, as soon as they are diagnosticated, should be removed at once by operation, all accessible parts likely to be infected being taken away. 3. Doubtful cases should be dealt with in the same way. 4. All recurrent growths should be removed at their earliest manifestation. 5. All non-malignant neoplasms, as soon as they show a tendency to enlarge, and especially between the ages of twenty-five and forty years, should be removed without delay.

Suggestions as to the Technique of Amputation.

Dr. Obalinski (*Centralblatt für Chirurgie*, No. 51, 1887) comments on the fact that though antiseptic methods have lowered the mortality of these operations from thirty per cent. to three per cent., yet ulcerative perforation of the soft parts by the sharp edge of the tibia is of frequent occurrence. He has devised a method which he recommends as simple, and as having been successful in thirty-eight leg amputations and twenty-two amputations in other parts of the body. Two lateral and equal musculo-tegumentary U-shaped flaps are formed. After section of the bone a row of plate sutures is inserted, the upper one being so placed that the silver wire lies in front of the tibia, the two plates pressing upon the anterior surface of the bone, at least a third of an inch above the sawed edge. The edges of the flaps are then approximated by the ordinary knotted suture. This method of suturing brings the soft parts together so that there is a projection above the sharp tibial edge shaped much like a cock's comb, and the weight of the flaps is no longer supported by a thin layer of skin stretched over a hard, sharp projection. Upon the upper plate sutures there must be considerable tension, but the operator is cautioned against making undue pressure. The resulting stumps were satisfactory, the projections of the soft parts gradually disappearing.

Helferich (*Münich med. Woch.*, No. 36), with a similar object in view, cuts a lateral skin flap from the inner surface of the leg, and enforces a lateral decubitus in his patients, by which means the skin is separated from the bone by a thick pad of muscular tissue.

Mosetig's plan (*Wiener med. Presse*, No. 45) is to cut two lateral muscular tegumentary flaps, the outer having a much greater circumference than the inner. By suturing from below a portion of the large flap is left projecting anteriorly; this is folded transversely upon itself, and in turn sewed in that position. Thus a duplication of the tissue projects upon the sharp edge of the tibia little likely to yield to the pressure to which it is subject. He has used this method in five cases with satisfactory results.

[The simpler plan of bevelling the edge of the tibia, and of preventing undue pressure afterward by care in the application of the dressings, will in the great majority of cases of leg amputation obviate the need for these clumsy and complicated methods of operation.]

Extirpation of the Scapula.

Ceci reports (*Centralblatt für Chirurgie*, Dec. 17, 1887) a successful case of total extirpation of the scapula, with subsequent regeneration of the bone. The arm was preserved. The patient, a young man, developed an acute osteomyelitis of the left scapula five days after circumcision for inflamed phimosis. One month later Ceci extirpated the bone, making the usual L-flap. The periosteum was left intact as far as possible. The patient recovered rapidly. Ceci has collected 47 cases in which this operation was done. In 45, of which the termination is known, there was a mortality of 20 per cent. He thinks that a favorable prognosis should depend partly on the subperiosteal method of operating. The separation of the periosteum should be begun in the dorsal surface of the bone.

Drainage in Suppurating Synovitis of the Hand and Forearm.

M. Courtade (*L'Union Médicale*, No. 35, 1888) reviews the incisions recommended by Gosselin, Dolbeau, Nélaton, and Tillaux, and makes to all of them the common objection that they give imperfect drainage, and by prolonging the case favor the adhesions of the tendons to one another. He proposes the following operation:

1. Make at the level of the anterior border of the ulna, and from one-third to one-half an inch below its inferior extremity, an incision about two inches in length; after having divided the skin and aponeurosis, penetrate with a tunnelled sound or with the finger under the flexor muscles, and in front of the pronator quadratus.

2. On the internal border of the flexor carpi radialis tendon, about one-third of an inch within the radial artery, and a short distance above the fold of skin which marks the upper limit of the thenar and hypothenar eminences, make an incision two inches in length. After the division of the deep fascia the bistoury should be abandoned, and the tunnelled sound passed into the tendinous interspaces until pus is reached. Now pass a drain between the two openings and use washings, or irrigation. The drain, when withdrawn, should be replaced by a thread to facilitate its reposition, if it becomes necessary. Passive movements should be begun early.

OTOLOGY.

UNDER THE CHARGE OF

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Report of 5700 Cases of Ear Disease.

Dr. S. S. Bishop, of Chicago (Ninth International Medical Congress), from the statistics of the ear cases treated during the last eight years in the Illinois Charitable Eye and Ear Infirmary, has drawn the following conclusions:

1. Youth is a predisposing cause; more than one-fourth of the whole number of cases were under fifteen years of age.

2. Sex does not exercise any appreciable effect in the disease.

3. About eighty per centum were chronic diseases, and about ninety per centum were diseases of the middle ear.

4. The causes of nasopharyngeal catarrh are the proximate causes of middle ear disease.

5. The nervous temperament was predominant.

On Clinical Groups of Diseases of the Ear.

Mr. Jonathan Hutchinson (*Medical Press*, January 11, 1888) proposes that a more clinical classification of ear diseases be made to take the place of the more pathological one now in vogue. He would make two grand divisions, viz., the catarrhal (from the effect of cold in the ear), and the gouty.

The first group is subdivided into four classes, since the influence of cold on the external ear may be productive of several different results:

1. It may cause an attack of erysipelas of the ear.

2. It may cause swelling of the whole of the lining of the cavity of the external ear, with some fluid discharge from the glands, a sort of acute inflammatory seborrhœa.

3. It may cause a local periostitis with the formation of matter. This periostitis may be either limited or diffuse.

4. The inflammation may complicate the membrana tympani, especially at its margin, and thus come to involve the middle ear.

The constitutional treatment, of course, is to be antiphlogistic, with, locally, warmth to the ear.

In regard to the second group, the gouty, Mr. Hutchinson says: "It might be expected that gout would show its power in several different ways. First, we might have attacks of acute gout, in all respects resembling those we meet with in the great toe, occurring in those in whom other conditions demonstrated the existence of the diathesis. These would probably be attended by very severe pain, and would be transitory, with more or less damage to the organ. Different structures of the ear might be attacked. Next, we might encounter chronic and insidious changes in different parts of the ear in connection with the slow deposit of urate of soda. It is certainly a very extraordinary fact if the membrana tympani always escapes this deposit, as it is precisely the structure likely to attract it. This condition would be probably attended with gradually increasing dulness of hearing. A third group of cases might be expected, in which changes analogous to those of rheumatic gout would be found in connection with similar changes in the largest joints of the limbs." Of course, this is purely theoretical, but, nevertheless, suggestive of investigation.

The Wet-cup, instead of the Leech, in certain Acute Diseases of the Ear.

Dr. Gorham Bacon, of New York (*Medical Record*, January 7, 1888), suggests the use of the wet-cup, in place of the leech, in acute otititis externa or media, and also in inflammation of the mastoid.

This substitution is made for the following reasons:

"1. Many patients, and especially children, have a great repugnance to having a leech applied to the ear, so that it is extremely difficult in such cases to use them.

"2. The bleeding from a leech-bite is frequently difficult to arrest.

"3. A leech-bite occasionally gives rise to erysipelatous inflammation and ulceration, and not infrequently produces a circumscribed abscess, even in apparently healthy individuals.

"4. Leeches are not always to be had, especially in the country, and are very frequently a troublesome remedy, besides being expensive."

Zaufal's Pneumococci in Acute Otitis Media.

From a letter of Dr. H. Chatellier to the *Annales des Maladies de l'Oreille* for January, 1888, we learn that in his investigations on the above-named

subject, Prof. Zaufal follows the plan of Koch in the isolation and examination of the colonies (culture in patches), and employs the different methods for coloring the microbes, in vogue in ordinary bacteriological researches. In the liquid filling the tympanic cavity, in cases of acute otitis media, Zaufal finds exclusively the two forms of microbes found by Friedländer and Fränkel in pneumonia, viz., a large, short bacillus, encapsuled, and a diplococcus also encapsuled. Zaufal claims also to have shown that the exudations in acute otitis media, before rupture of the membrana tympani occurs, contain pneumococci to the exclusion of all other microörganisms, and that these pneumococci introduced in the nasal fossæ can give rise to a pneumococcic meningitis without irruption of the cranial envelope.

On the Effect of High Atmospheric Pressure on the Ear.

Dr. Samuel Sexton (*Medical Record*, New York, December 10, 1887) has written an interesting paper on this topic; based chiefly upon the observation of the effects of pressure in submarine caissons, upon the ears of workmen employed therein. Many of the men thus affected become permanently affected in health and hearing. Sometimes there are previous warnings in the form of great pain in the ears when under pressure in the caisson; soon after this, if the subject perseveres in the endeavor to work in the caisson, greater pains set in, with inflammation and suppuration of the ear. Five cases are reported by Dr. Sexton, occurring in individuals more or less run down in health, and intemperate in drink. It is suggested that were none but healthy persons employed, or those with perfectly healthy ears, and free from gross catarrhal diseases with nasopharynx and Eustachian tubes, ear disease among the caisson workmen would be less frequent. The presence or absence of these forms of predisposing disease could be found out only by expert examination.

Relation of Adenoid Growths in the Nasopharynx to the Production of Middle Ear Disease in Children.

Dr. Clarence J. Blake, of Boston (*Boston Med. and Surgical Journal*, March, 1888), calls attention to the important train of symptoms which come from the presence of adenoid growths in the nasopharynx of children. They are such as would result from interference with the normal ventilation and nutrition of the middle ear tract, and are more or less permanent, according to the duration and size of the adenoid growths.

In the earlier stages, when the growth is small, the ear is noticeably affected only when, in addition to the bulk of the growth in the nasopharynx, there is added swelling of the mucous membrane of the region in a head cold. As the growth increases, a less swelling occasions now comparatively greater disturbance, and the intervals of freedom from impaired hearing, nocturnal earache, and subjective noises in the ear, become shorter and rarer. In the meantime, changes are taking place in the structure of the middle ear, which are more or less permanent. The membrana tympani is retracted, the tendon of the tensor tympani is relaxed, the mucous lining is thickened, the ossicles become more or less ankylosed, the nutrition of the middle ear is lowered, and ulceration and suppuration are easily set up.

The aural symptoms in such cases may be divided into three classes. *First*, those in the earlier stages, with some earache amd impaired hearing, with a cold in the head. These are always improved—*i. e.*, cured under proper treatment of nares and middle ear. The *second* class are the more advanced cases of the above, due to neglect. The hearing is greatly and persistently impaired, and the child regarded as a mute or an idiot. In many of these cases the air douche failing, it has been found that catheterization of the Eustachian tube has decidedly and immediately improved the hearing, and entirely changed the objective symptoms in the ear, the membrana tympani, previously dull in color and in lustre, returning to the normal appearance in a greater or less degree in both respects. To the *third* class belong those cases already alluded to, in which suppurative otitis media is a result of the disease in the nasopharyx, set up at last by some local exciting cause. These cases can be cured only after the adenoid growths are removed.

Polypi in the Middle Ear, showing Bad Effects of their Pressure.

Dr. Clarence J. Blake, of Boston (*Annales des Maladies de l'Oreille*, January, 1888), reports two cases in which a tumor (polyp) between the external wall of the drum cavity (the membrane) and the incus, extended downward and backward, so as to press upon the body and long process of the anvil, thus exercising pressure upon the labyrinth, through the oval window. In the first case, the polyp was so placed as to press upon the facial canal and nerve and produced facial paralysis. In the second case pressure of the tumor upon the incus, the stapes, and the labyrinth was sufficient to maintain an irritation in the semicircular canals, and produce vertigo, tinnitus, and augmentation of intralabyrinthine circulation. In both cases entire relief followed removal of the polypi.

On the Determination of Important Topographical Relations in the Temporal Bone from the Form of the Skull.

Dr. Otto Koerner, of Frankfort-on-the-Main (*Archives of Otology*, Dec. 1887), has attempted to answer the question: "Is there any way in which we can foretell whether any given temporal bone is, or is not likely to be dangerous for operation on account of the position of the lateral sinus?"

The answer depends upon a consideration, whether the exact situation of the floor of the middle cranial fossa and the course of the transverse sinus in the temporal bone, in any way depend upon the form of the skull. He examined one hundred and twenty temporal bones selected from thirty-eight different races, and twenty-two exclusively German. The result showed "that the floor of the middle cranial fossa in dolicocephalous skulls lies higher above the porus acusticus externus and the spina supra meatum than in brachycephalous skulls." This seems to show that it is desirable in every operation on the mastoid to begin as far forward as possible.

The measurements show that the transverse sinus lies further outward in brachycephalous skulls than in dolicocephalous, and that, independent of the form of the skull, it lies further outward on the right side than on the left. In order to avoid the sinus in operations on the mastoid, the following rule is proposed: "The smaller the index of the skull, the farther forward the open-

ing should be made; if the patient is an adult, with an index of 1.30, or less, we ought to operate, if possible, in front of the auricular attachment, particularly if the right antrum is the one involved."

The sinus in the brachycephalous is more dangerously—*i. e.*, superficially—situated than in the dolicocephalous skull, because the great horizontal blood-vessel of the dura does not generally divide at the torcular Herophili with a right and left sinus, but it continues on as the right sinus, whilst the left receives the lesser blood supply from the vena magna Galeni.

"Under these circumstances then, it would seem as if the pressure of the blood current against the curves of the sinus would, during the growth of the bone, burrow for itself the deepest at the spot against which it was propelled with the greatest force, which apparently occurs on the right side in brachycephalous skulls, because in them the posterior cranial fossa being broad and narrow, the sinus alongside will be more sharply curved than in the longer and narrower fossa of the dolicocephalous skull."

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Hydrogen Peroxide in Diphtheria.

Dr. Marcus P. Hatfield, of Chicago, extols (*The Archives of Pediatrics*, February, 1888, p. 102) the topical efficacy of the ordinary solution of hydrogen peroxide in diphtheria above every other antiseptic. It is applied directly with a swab, or in spray (two ounces of the solution diluted with seven times its bulk of water). Diphtheritic throats treated thus every two hours, did not become, even in the worst of eighteen cases under observation, putrid and offensive. Hydrogen peroxide does not act as a solvent of the membranes, nor prevent their formation, but acts rather as their disinfectant and as their antidote, neutralizing the poison of the diphtheritic exudate.

Blennorrhœa of the Larynx.

Dr. Krakauer exhibited a patient (*Deutsche med. Woch.*, No. 49, Dec. 8, 1887) with Störk's blennorrhœa, in the person of a thirty-six years old female who had never been sick.

There was no evidence of tuberculosis or syphilis. Repeated temporary attacks of hoarseness had occurred of late years. An attack three weeks before gradually led to the following conditions: Grayish-brown crusts beneath the vocal bands parallel to their free borders and somewhat projecting beyond them, especially extensive toward the anterior commissure, and preventing

proper glottic closure. The calibre of the larynx was much encroached upon, and there was marked dyspnœa and *fœtor ex ore*. The nasal membrane was nearly normal, save a slight atrophy without any crusts or abnormal secretions. The nasopharyngeal space was in a similar condition. The epiglottis and aryepiglottic folds were somewhat reddened. The prognosis was considered grave on account of the liability of the edges of the mucous membrane to excoriation from the crusts, and the consequent disposition to adhesions.

Unilateral Laryngectomy.

Dr. Wolfenden completes (*Journal of Laryngology and Rhinology*, January, 1888) his articles on laryngectomy (see *Amer. Journ. Med. Sciences*, 1887) with tables of unilateral exsection, as follows: 28 cases for carcinoma, 2 for sarcoma, and 10 for other conditions, principally stenosis, perichondritis, and enchondroma. He summed up the following conclusions:

"From the tables it is seen that out of 29 cases of unilateral extirpation for carcinoma, 4 may be said to have died from the effects of the operation, and in 7 recurrence is noted. Ten were reported living at the end of a year after the operation. The results, so far as they go, are much better in sarcoma, but it must also be remembered that sarcoma of the larynx has been cured by endolaryngeal methods, just as carcinoma has. About thirty-five per cent. may be taken as the average percentage of successes, and the operation, therefore, shows results at least three times as favorable as that of total ablation, and may in the future show a still better average. Allowing for the fallacious nature of statistics, and for the fact that it has not been possible to trace some of these cases, and for possible error in others, the general deductions from tables such as these must be decidedly adverse to the maintenance of total ablation as a practical surgical procedure, but will direct attention to the perfection of the methods of operating by, and knowledge of, the indications for the operation of partial excision of the larynx in malignant disease. The records of cases cured by endolaryngeal procedures will also cause us to hesitate before advising severe measures, especially in cases where diagnosis admits of any doubt. . . . . .

"While it is impossible to draw as yet any exact conclusions with regard to the operation, it is evident that so far as regards recurrence of this disease, it is not more frequent after partial than after total extirpation; and while after the former operation some (and in many cases a very good) voice is preserved to the patient, the general condition is one of comfort, compared with that of the individual who has submitted to total extirpation of the larynx. While we have statistics enough to show the terrible nature of this latter operation, and the appalling uniformity of results, partial extirpation stands in a much more favorable light, and though the operation is young compared with that of total ablation, it has so far given results which render it much more acceptable as a surgical procedure. Many surgeons, indeed, consider total ablation no longer a justifiable operation. Partial extirpation, on the contrary, is an operation the practice of which promises in the future much success, but even this should not be undertaken unless it is proved to be no longer possible to eradicate the disease by endolaryngeal methods. That this, however, is possible has been clinically proved."

Tumor (Sarcoma) of the Trachea.

Zemann demonstrated (K. K. Gesell. d. Aerzte in Wien, *Deutsche med. Woch.*, January 12, 1888, p. 36) a tumor of the posterior wall of the trachea of the size of a walnut. The patient died October 25, 1887. In 1867 and 1869 he had been operated upon by Schrötter. Death was due to broncho-blennorrhœa. Microscopic examination showed the tumor to be a sarcoma which appeared to be strewn with very wide vessel spaces. Such tracheal tumors are rare. A case has been reported by Mayer-Hunny, and another by Schrötter.

In 1867 Schrötter saw this case. A tumor was seen in the right posterior wall of the trachea, moving with inspiration and expiration, and so nearly filling the calibre of the trachea that the mucus on the anterior surface of the tumor smeared the anterior wall of the trachea; and yet the patient could endure a certain amount of physical exertion. He removed about two-thirds of its anterior portion with a guarded Aluseux's forceps intralaryngeally. The remnant bled freely. It was injected with iron sesquichloride and shrunk considerably, an eschar having immediately followed the injection. Patient remained well until 1869, when recurrence took place, the tumor being firmly seated in the posterior wall and not moving with the respiratory current. In 1870 the recurrent tumor was removed intralaryngeally. In 1879 a second recurrence was observed. The patient declined an external operation. He was not much incommoded by the growth and was contented with his condition. His breathing became better, and this was attributed to a downward deflection of the anterior portion of the tumor so that the air passed between this portion and the anterior tracheal wall.

Tracheo-bronchic Adenopathy in Typhoid Fever.

A case of typhoid fever in Dr. Hanot's hospital service is detailed (*Arch. gén. de Méd.*, February, 1888, p. 230), which was characterized by marked dyspnœa. At the autopsy a mass of hypertrophied tracheo-bronchial glands nearly the volume of a fist was found at the posterior surface of the trachea and principally on a level with the bifurcation. The largest glands had the volume of a small nut.

Commencing at the upper rings of the trachea the mass of glands covered its entire posterior surface and followed along the bronchi quite to the interior of the pulmonary parenchyma. They were more abundant and more voluminous along the left bronchus than along the right one. The left lung was compressed against the vertebral column in a state of atelectasis. The right lung was healthy and presented only a little congestion at its base.

Extirpation of Goitre by Operation in Two Stages.

Dr. Jul. Wolff exhibited a patient to the Berliner Medicinische Gesellschaft (*Deutsche med. Woch.*, No. 49, Dec. 8, 1887) from whom, on a previous instance, he had removed a goitre in two sittings. Although the tumor was small, the dyspnœa was so great that the operation was performed with the patient in the sitting posture. At the first operation the isthmus was removed, and the right side of the trachea laid bare. After careful restraint

of the hemorrhage by methodic compression, a plan employed by the operator in twenty-one previous cases, the wound was filled with iodoformed gauze. Two days later the operation was completed. In both his cases the second operation was performed with very little danger, and with very little loss of blood, so that the operator commends this method in similar instances.

Nasal Stenosis and Pulmonary Distention.

Dr. G. Sandmann, of Berlin (*Berliner klin. Woch.*, Jan. 9, 1888) expresses his belief in nasal stenosis of various origin, as a cause not only of ordinary distention of the pulmonary alveoli, the false emphysema of Cohnheim, but likewise in the ultimate production of true pulmonary emphysema characterized by atrophic disappearance of the walls of the alveoli, due, according to his opinion, to disturbances in the circulation produced in the first place by the simple alveolar distention.

In the same journal a week previous, in a lecture on pulmonary emphysema, Prof. Virchow took exception to these very views, and stated that not only were cases of nasal, laryngeal, and bronchial stenosis rarely associated with emphysema, but that the pronounced emphysematic patient has not, as a rule, any material constriction in any of these large aërial conduits.

Antipyrin in Epistaxis.

M. Hénocque (*La Semaine médicale*, Jan. 11, 1888) extols the topical use of a solution of antipyrin (twenty per cent.) by insufflation or by injection in epistaxis. He believes that antipyrin causes constriction of the vessels, and at the same time causes coagulation of the blood.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

OF PHILADELPHIA.

A Comparison between Craniotomy, Induced Labor, and Cæsarean Section.

Wyder, of the Charité at Berlin, contributes to the *Archiv für Gynäkologie*, Band 32, Heft 1, a comparison between these three methods of treatment, which is a most rational plea for due conservatism in assigning a place to the improved Cæsarean section—Sänger's operation.

Wyder considers the statement of Credé, that craniotomy on the living child should be superseded by Cæsarean section, as premature, although he admits that under favorable circumstances this is to be expected not far in the future. He quotes the statistics of the policlinics at Berlin and Leipzig, and the Halle clinic, aggregating 215 craniotomies, with a mortality of 5.6 per cent.; the Berlin clinic had a mortality in craniotomies of 13.2 per cent.

Regarding the mortality in different grades of contracted pelves, he states that in pelves whose true conjugate was three and a half inches and more, the mortality was fifteen per cent.; with a conjugate between two and three-quarters inches and three and a half inches, mortality ten per cent.; true conjugate between two and one-eighth inches and two and three-quarters inches, mortality nil. It is in the last class of cases that the Cæsarean section is generally performed. The complications following craniotomy were most frequently caused by efforts at delivery with forceps before craniotomy was done.

Regarding the induction of labor, 306 cases are cited, mortality 3.9 per cent.; and here, also, the cases in which the pelvic contracture was of the highest degree were without mortality.

In comparing these results with those of Sänger's operation, the first fifty cases reported by Sänger are taken; these statistics are criticised, and thought to be collated with an optimistic view of Cæsarean section. Wyder's comparison shows that in contracted pelves the mortality from Sänger's operation is 2.13 times greater than that in craniotomy, and 3.37 times greater than the mortality of induced labor. For "relative indications" (not highly contracted pelves) the mortality of Cæsarean section was 7.1 times greater than that of induced labor in highly contracted pelves. Sepsis is the great danger in Cæsarean section, and when it occurs it is to be ascribed to the operation, for the performance of the operation gives the best possible opportunity for septic infection.

In summing up his conclusions, Wyder recognizes the fact that many cases of labor fall into midwives' hands, or those of practitioners not versed in pelvimetry; they are not, therefore, treated in the most favorable period for Cæsarean section. He considers this operation, like ovariotomy and the removal of uterine myomata, a procedure to be undertaken only in well-equipped hospitals, by skilful operators. In estimating the prognosis of any case of contracted pelvis, the size, hardness, possibility of moulding, and position of the head, and all the other conditions essential for spontaneous birth, cannot be estimated as early as the time urged for Cæsarean section; the prognosis depends not only upon the degree of pelvic contraction, but upon those factors also.

Regarding the child's life, we are to guard it so long as the mother is in no danger, but when she is imperilled her interests only should be considered. In applying Credé's "golden rule" for obstetricians, "What would you do if the patient were your wife, your sister, or a near relative?", Wyder believes that few practitioners would not hesitate to perform Cæsarean section when other methods are available.

In forming rules for practice, Cæsarean section is undoubtedly indicated in highly contracted pelves when the patient is found in advanced pregnancy. In the early months of pregnancy the induction of labor is indicated; with antiseptic precautions it is without danger. In contracted pelves of conjugatæ veræ, two and one-eighth inches to two and three-quarters inches, Cæsarean section and craniotomy are direct rivals; the maternal mortality of the fifty cases of Sänger's operation, Wyder estimates at 17.9 per cent.; and he believes that when this mortality shall be reduced to that of craniotomy, in hospitals and localities where Cæsarean section can be readily performed, craniotomy

should yield to the Cæsarean section of Sänger. He believes that Cæsarean section will be rarely done in pelves but slightly contracted, and most rarely in primiparæ.

Wyder closes with the reiteration of the cardinal points of his paper, and urges the restriction of Sänger's operation to skilled hands and proper hospitals, and that the mother's life should have unquestioned and paramount supremacy.

[The material from whose study Wyder draws his conclusions was 9000 cases of labor at the Charité at Berlin, and 6000 at the Policlinic Service, material ample enough and favorably situated; he compares the results obtained in Berlin with those of other cities, finding a substantial agreement.

In view of the success which attends the revival of Cæsarean section in the United States (see *The Medical News*, March 31, 1888, p. 349), a conservative discussion of these procedures is timely and valuable. Such comparative study will assign to Sänger's operation its true place, define clearly the indications for its performance, and improve the results of the operation.—Ed.]

Cæsarean Section in a Case of Uncontracted Pelvis.

Gustave Braun reported, at a recent meeting of the Society of Physicians of Vienna, a case which he stated to be the first case of Cæsarean section for what is termed a "relative indication." The indication for performing the operation was the fact that there were no grounds for hoping for a favorable termination of labor without Cæsarean section. The patient was a primipara, aged thirty-seven, who was in good health during her pregnancy. The liquor amnii escaped after sudden rupture of the membranes; labor pains continued irregularly for a week without effect, and the patient sought the hospital.

Examination revealed a tetanic condition of the uterus; the vulva was very narrow; the perineum rigid; the lower segment of the uterus was dilated. There was no real contraction of the pelvis; but after observing the patient for nearly twenty-four hours, Braun concluded that the only hope for the child's life, and perhaps the mother's, lay in Cæsarean section. He accordingly performed the operation. Mother and child recovered perfectly.—*Wiener Medizinische Presse*, No. 9, 1888.

Intra-uterine Hemorrhage during Pregnancy.

Budin is reported by the *Progrès Médical*, Nos. 2 and 3, 1888, in a clinical lecture on this subject, as follows:

He describes the case of a woman who induced a discharge of reddish fluid by efforts at urination, a month before the end of pregnancy. This was followed by labor, in the first stage of which she was brought to the hospital. On examination the urine was found highly albuminous; there was well-marked œdema of the abdomen and thighs. Palpation was uncertain, no evidences of fœtal life were present. On vaginal examination a breech presentation was diagnosticated, the lower extremities were rigid, and delayed delivery somewhat. The expulsion of the placenta was followed by the removal of more than a quart of bloody serum and clots; after which the

uterus contracted normally. The fœtus had been dead for some time, as its lower limbs were of waxy consistence.

Budin believes that there is a causal relation between albuminuria and intra-uterine hemorrhage; small hemorrhages, placental apoplexies, are not infrequent, but profuse hemorrhage is rare. Such loss of maternal blood commences by the extravasation of blood between the placenta and the wall of the uterus; if the placenta prevents the exit of the extravasated blood it may accumulate at the centre of the placenta, whose border remains adherent. The situation of the placenta at the lower segment of the uterus may be such that blood may escape externally from time to time; in twin pregnancies an accumulation of blood between the membranes may occur.

The most frequent causes of such hemorrhage are traumatism, efforts at defecation, or any exertion which increases the tension of the abdominal bloodvessels, nervous disturbances and conditions altering the constitution of the maternal blood.

The diagnosis of intra-uterine hemorrhage during pregnancy is often difficult; variations in the contour of the abdomen sometimes aid in recognition of the condition. When the hemorrhage is profuse constitutional depression presents well-marked symptoms easy to apprehend. Severe uterine pain and sudden increase in the size of the uterus are also symptoms of profuse intra-uterine hemorrhage. These symptoms are followed by the discharge of blood or reddish fluid from the vagina; the continuance of hemorrhage and the accumulation of blood within the uterus may result in irritating the uterine muscle and inducing labor. Most commonly, however, the milder grades of hemorrhage are met with, and few, if any, symptoms are easily discerned.

After delivery examination of the placenta will commonly reveal changes in its form caused by retained clots, which also leave their impress upon the membranes with which they have been in contact; the disorganized blood discharged after labor is to be distinguished from fresh blood.

The prognosis of this complication of pregnancy is grave, the mortality of mothers being about 50 per cent., of children over 90 per cent. The treatment indicated is rapid delivery, if the mother's life is in danger. If not, authorities differ, some urging an expectant plan, securing thereby the pressure of the bag of waters as a hæmostatic, while others urge immediate dilatation of the cervix and delivery. Budin agrees with the former.

The Normal Course of Puerperal Temperature.

Hunt, in the *Practitioner* for February, 1888, reports the results of an inquiry into this subject, which elicited reports from seventy-five cases. The first point of interest in these reports is that a large number of cases were free from pyrexia. In 27 per cent. the temperature did not exceed 99°; in 16 per cent., 99.4°; and in 23 more it never exceeded 100°. Thus, in 70 per cent. it never exceeded 100°, and in 43 per cent. it was always practically normal —that is, no higher than 99.4°. Of the remaining twenty cases, in twelve it varied from 100°–101°, in four from 101°–102°, in three from 102°–103°, and only exceeded the latter temperature in one case, rising to 103.4°.

With regard to the date of the highest temperature, a consideration of fifty-one of these cases (omitting those which were normal throughout) shows

that in ten the temperature was highest on the first day. In many of these cases, however, the cause of the rise of temperature was almost certainly a neurotic one; in nine the highest temperature was on the third day, in eight on the fourth, and in eight more on the fifth day, and in seven on the second. There thus appears to be very little difference between the various days, after the first the third having a very slight superiority.

With regard to perineal tears, the rise of temperature was slightly above the average, but not markedly so. Of the seventy-five cases under consideration, ten had lacerated perinæa, all of them, to the credit of the doctor be it said, but slightly torn. In one case the temperature was normal throughout, in three the highest temperature was between 99° and 100°; in three between 100° and 101°; in two between 101° and 102°, and in one 102.2°. In the worst case the tear extended half-way to the anus, taking place in the cicatrix of an old tear; three stitches were put in at once, but the wound did not heal, probably owing to the insanitary condition of the house. In this case the highest temperature recorded was on the fourth day, 99.2°, and this slight rise might have been accounted for by cracked nipples. In the one case in which the temperature reached 102.2°, the tear was very slight, and the rise due to mental causes. In the only other case worth noticing the tear was three-quarters of an inch in length, and one suture was used. The recorder remarks, "This was a hard forceps case in a primipara; throughout the first week the temperature varied from 99° to 100°."

With regard to the use of forceps. Seven cases were recorded, in none of which was the temperature normal throughout. In three, or 45 per cent., it did not exceed 100°, and the highest temperature noted in any was 101.4°. Two of the cases are recorded as difficult, and in three the forceps were applied when the head was either at or just through the brim.

With regard to the primiparæ, who numbered twenty-one out of the seventy-five cases, in four, or 19 per cent., the temperature was normal throughout; in eleven, or 50 per cent., it did not exceed 100°; in four it exceeded 101°, and in one 102°.

The highest temperature was occasioned by sudden grief. Adherent placenta caused a temperature of not over 102°, the highest being produced by a mild septic absorption. If the mammary secretion was established normally, without distention or cracked nipples, no fever occurred. Retention of feces and urine caused a rise of temperature; after-pains, with expulsion of clots, also.

The deductions which may be drawn from these investigations seem to be that in a large number of cases, as we should expect would be the case in a purely physiological act, labor and the lying-in period are free from any marked fever; but at the same time the whole system, and especially the mental system, is in a state in which it is very ready to receive impressions from without, and that any reflex irritation or any mental excitement causes a rise in the temperature which may be most marked, but which ceases on the removal of the cause.

Accidents caused by Intrauterine Injections.

Mangnin, of Paris, contributes a paper of practical interest to the *Nouvelles Archives d'Obstétrique et de Gynécologie*, No. 12, 1887, and Nos. 1 and 2,

1888, upon this topic. He finds that those who have reported such accidents have given as their exciting causes passage of fluid into the peritoneal cavity through the Fallopian tubes; entrance of air into the venous sinuses of the uterus; entrance of liquid into the uterine veins; absorption of retained fluid after injection; percussion of the uterus by fluid forcibly introduced; rapid distention of the uterus; the production of hemorrhage; detachment of an embolus; the appearance of rigors, metritis, or peritonitis.

Mangnin divides accidents caused by intrauterine injections, from the clinical standpoint, into accidents from retention of fluid; septic accidents; accidents resulting in nervous shock. The simple retention and gradual absorption of fluid is not of very frequent occurrence, generally accompanies repeated injections, and can, therefore, be avoided.

There is sufficient evidence on record to demonstrate that fluid may pass along the Fallopian tubes into the peritoneal cavity. Fontaine has shown that but very moderate pressure is sufficient to force fluid through the tubes. In health, however, the tubes admit fluid only drop by drop, and hence a safeguard is afforded against the rapid entrance of fluid.

In conditions of the uterus accompanied by dilatation of the tubes, as interstitial fibromata, endometritis associated with salpingitis, fluid will pass more readily. In addition to cases previously reported, Manguin adds the case of a patient in the clinic of Doléris, who was treated for interstitial fibroma of the anterior wall of the uterus. The first intrauterine injection of bichloride of mercury solution, 1 to 2000, was not followed by ill effects. The second, two days later, caused sudden and severe pain, followed by symptoms of intoxication with mercury. The uterus was carefully emptied of any contained fluid, although but very little was found, and the patient recovered. Careful examination of the circumstances attending the accident led to the belief that fluid had traversed the Fallopian tubes. Cases reported by others are cited, where poisoning from various antiseptics followed injections, fluid having traversed the tubes, in puerperal cases.

The direct entrance of fluid into the circulation through the uterine veins is the most frequent accident accompanying the retention of fluid, and is followed by the gravest results. Physiologists have shown that the blood tension in the uterine veins is such that but moderate pressure is needed to cause an injected fluid to penetrate the uterine vessels. It follows, that should fluid be retained, it may readily enter the circulation. The uterus, when empty, closes its venous sinuses by its complete and symmetrical contraction. The retention of a portion of the placenta or membranes, by preventing complete contraction of all portions of the uterine surface, favors the passage of fluid. If the fluid be innocuous, but trifling effects will follow; but if it be an irritant (preparations of iron, mercury, or carbolic acid), embolism or poisoning will occur.

Septic accidents are characterized by the occurrence of rigors and fevers, following intrauterine injections. Maugnin believes that these phenomena are caused by the entrance of septic matter, contained in the uterine lymphatics, into the circulation through the pressure of uterine contraction caused by the stimulus of the intrauterine douche. A previous septic infection generally exists in these cases, and the douche, by promoting septic absorption, causes exacerbations of septicæmia. It is evident that repeated intrauterine

injections are rarely indicated in puerperal septicæmia, and that the greatest caution is requisite to prevent them from doing harm. Several cases are cited in which the cessation of douches was followed by the cessation of rigors and fevers.

The nervous shock produced by intrauterine douches occurs in non-pregnant, nervous women, and is a reflex caused by the impact of the injected fluid. It is of little importance, and not followed by serious results.

Mangnin concludes that it is of the greatest importance that intrauterine injections be given through a double canula, that devised by Doléris being his choice, but the essential element being two constantly pervious channels. The canula, catheter, or tube should not be capable of compression and occlusion by the cervix, for the cervix is sometimes stimulated to contract by the insertion of the canula, and if it is occluded, the fluid imprisoned in the uterus is readily absorbed. All apparatus which *propels* fluid is rejected; only the "fountain syringe" (a receptacle placed above the patient's level) is recommended. This receptacle should not be higher than ten or twelve inches above the patient, and to obviate the danger of retention of fluid, the return tube should be carefully guarded and connected with a receptacle placed beneath the patient.

Especial caution is indicated when the uterus contains a portion of placenta, membranes, or a tumor, for reasons already stated. All violence should be most carefully avoided; also the injection of air. In cases of renal implication, mercurials should not be used; if their use is unavoidable they should be followed by injections of hot water. The temperature of intrauterine injections should be 85° or 86° F. in ordinary cases. Cold injections should never be given. Accidents following vaginal douches and presenting the symptoms of those caused by intrauterine injections, are generally the result of inserting the canula within the cervix, or the entrance of fluid through a patent os and cervix. Equal precautions should be taken in giving vaginal injections.

Ovariotomy during Pregnancy; Recovery; Delivery at Term.

The *Sei-I-Kwai Journal*, No. 2, 1888, of Tokio, Japan, reports an interesting case of ovariotomy at three months pregnancy, followed by recovery and delivery of a healthy child at term. The cyst was of the left ovary, and recovery from the operation was complicated by pleuro-pneumonia. The patient rallied, however, and left the hospital convalescent on the twenty-sixth day after operation. Although a sound had been introduced into the uterus, in addition to the ovariotomy and subsequent illness, the patient was delivered of a healthy child at term, and the puerperal period was normal.

Scarlatina in Pregnancy; its Relation to Puerperal Fever, and Treatment.

At the meeting of the Obstetrical Society of London, of March 7, 1888, Dr. Boxall read the concluding sections of a paper on scarlatina in pregnancy, in which he discussed its relation to puerperal fever and its treatment, as follows:

A brief summary of sixteen cases of undoubted scarlatina was given, and in only one case were the scarlatinal manifestations associated with signs of septic poisoning. Forty lying-in patients are known to have been exposed to one or more of the above cases of scarlatina. This series was presented in a tabular form, giving the time and duration of exposure and the course of the puerperium. On this evidence it was apparent that such exposure resulted in no detriment to the puerperium. As it might be urged that the three hundred patients or more admitted during the prevalence of scarlatina were to a greater or less extent exposed, a chart (together with the percentage tables from which it was constructed) was also appended. This indicated the morbility (as judged by the temperature) prevailing not only during the whole scarlatinal period, but also during the three months which preceded the outbreak. The prevalence of scarlatina in the hospital was thus shown to have exerted no appreciable effect on other lying-in cases during the same period. The special value of local antiseptic measures in scarlatina during the lying-in period having been discussed, the following conclusions were offered: 1. That infection by poison of scarlatina generally produces in the puerpera a disease which presents for the most part the usual symptoms of scarlatina, and runs the ordinary course of the disease without the appearance of septic manifestations. 2. That the disease, in addition to the usual symptoms of scarlatina (to a certain extent modified), may occasionally present signs of septic poisoning; that, when present at the outset of the disease, pelvic inflammation and septicæmia may usually be regarded as accidental complications, but, at a later stage, such signs may be the expression of septic processes analogous to the secondary throat of ordinary scarlatina. 3. That in rare instances the disease may assume a masked form, in which the ordinary signs of scarlatina are absent, or so slight and evanescent as to escape observation; and that, in some such cases, the only manifestation of the illness may be found in signs usually referred to septic poisoning.

After referring in very brief terms to remedial measures, the author discussed the means which should be adopted to prevent the spread of scarlatina to pregnant and parturient women. He pointed out the advisability, on the one hand, of isolating all scarlatinal cases and disinfecting all contaminated articles; and, on the other, of shielding pregnant and parturient women from the many risks of scarlatinal infection which surround them, and when possible, of removing such patients from any district in which the disease is prevalent. The influence of a third person as a vehicle of infection was discussed, with special reference to the conditions under which it is likely to be exercised; and the measures which may be adopted to counteract that influence were pointed out. Finally, as the poison may be carried not only directly by the hands, but also indirectly by the clothes and general surface of the body, and possibly also by the breath, and subsequently given off into the atmosphere (from which it is inhaled by the patient), it was concluded that thorough washing and disinfection of the hands is not sufficient to ensure protection, but that a disinfectant bath, a complete change of clothing, and active outdoor exercise, should be also included in the necessary precautions, and that these measures should be adopted not only by the doctor, but also by all other persons who had been brought into contact with scarlatinal poison, and especially by the nurse prior to attending on a lying-in woman or even visiting a patient advanced in pregnancy.—*Lancet*, March 24, 1888.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D., M.R.C.S.,

OF NEW YORK.

The Flap Operation for Repair of Ruptured Perineum.

Sänger (*Sammlung klin. Vorträge*, No. 301) reports eighteen successful cases in which he operated according to Tait's method, and commends it highly. He gives the following brief directions:

1. In incomplete rupture insert a cotton tampon into the rectum, split the recto-vaginal septum transversely with a pair of sharp-pointed scissors, curved on the flat, over a surface five-eighths of an inch long and one and a half inches wide. From each end of this cut surface make two vertical incisions (having the shape of |_|), draw the flaps upward and unite the edges of the quadrangular raw surface by deep silver sutures carried on a curved needle, with intermediate sutures of silkworm gut, the latter being removed on the seventh, the former on the fourteenth, day.

2. In cases of kolpocele, with or without laceration of the perineum, the same operation is performed (preceded by amputation of the portio vaginalis, or kolporrhaphy, if necessary), but the vertical incisions are carried further forward, so as to form a very narrow introitus and high, thick perineum.

3. In old lacerations through the sphincter he splits the recto-vaginal septum transversely with a scalpel, forming a vaginal and a rectal flap, then the lateral incisions are made as before, and are carried backward as far as the ends of the sphincter muscle (forming a figure H); the vaginal flap is drawn forward, the rectal backward, the raw surfaces being united as before, the sutures being introduced from the perineal side only, as this avoids the formation of a recto-vaginal fistula. The bowels are moved on the third day.

Hæmatoma of the Vulva in the Non-pregnant.

Himmelfarb (*Centralblatt für Gynäkologie*, March, 1888) calls attention to the rare occurrence of hæmatoma of the external genitals, except in connection with pregnancy. In the non-pregnant it is caused by mechanical violence, such as a blow or a fall upon some sharp object.

The following interesting case is cited: A married woman, thirty-five years of age, applied to the hospital, complaining of severe pains in the external genitals, associated with the presence of a tumor, which had suddenly developed a week before. On examination, the left labium majus was enlarged to the size of the fist, and obstructed the vulvo-vaginal outlet, so that the patient was obliged to push it aside in order to urinate. The tumor was tense, of a dark bluish color, and was exceedingly sensitive. No enlarged veins could be seen on the external genitals or the lower extremities. The internal genital organs were normal. The patient stated that immediately after violent coitus she was playfully bitten on the left labium by her amorous companion; she

felt severe pain, and a tumor rapidly developed at the site of the injury. The pain became so severe that she was finally compelled to seek medical aid. It was relieved by rest and cold applications, then the swelling was incised, a handful of coagulated blood was turned out, and the cavity was irrigated and packed with iodoform gauze. The wound healed rapidly.

Commenting on this case, Himmelfarb says that the tumor was of unusual size, and the cause unique. He had been able to find very few recorded instances in which hæmatoma of the vulva had followed such a slight injury. Possibly the general hyperæmia of the genitals consequent upon coitus might explain the extent of the effusion.

The Nature of the Hymen.

Sutton (*Ibid.*) infers from his embryological studies that the hymen is merely a septum which results from the imperfect fusion of the proctodæum with the urinogenital section of the cloaca. Imperforate hymen is present when this septum is complete, the other forms being due to different defects in it. In rare cases the hymen is absent at birth. An analogy is furnished by the mode of formation of the beginning of the alimentary tract, the mouth and pharynx being developed by the stomodæum, or involution of the surface-epiblast, which meets the blind anterior end of the fore-gut at a point corresponding to the future cricoid cartilage; when complete union occurs a diaphragm is formed similar to the hymen. In general, whenever in the embryo two culs-de-sac come together and exert mutual pressure, the part compressed becomes perforated, and a hymen-like septum results, which may subsequently disappear. It is interesting to note that abnormalities of the vulvo-vaginal orifice are frequently associated with defects in the alimentary tract.

Epithelioma Caused by the Long Retention of a Pessary.

Sawin (*Wratch*, No. 47, 1887) communicated to the Surgical Society at Kieff, the case of a woman who had a bloody, fetid discharge from the vagina. On examination he discovered a large wax pessary which the patient said had not been removed for eleven years. It was necessary to cut it in two before it could be extracted. The patient had never used vaginal injections, and the vagina was filled with fetid secretion, after removing which an epitheliomatous mass as large as a pear was seen on the lateral wall of the vagina, at the point where the pessary had rested.

High Amputation versus Vaginal Hysterectomy.

An interesting discussion of this question was held at a recent meeting of the British Gynecological Society (*Brit. Gyn. Journal* for February, 1888). It was introduced by Dr. Purcell, who reported a case of vaginal extirpation of the uterus for epithelioma in which recurrence took place four and a half months after the operation. Tait, who examined the patient, stated as his opinion that the disease had advanced more rapidly in consequence of the operation. The reporter said that, of the four patients whose uteri he had removed for cancer, one died in six months, and another ten and a half

months after the operation, while a third was then in good health after the lapse of two years. He believed that total extirpation is justifiable only when the disease is confined to the body, the organ not being greatly enlarged and still movable, while the vagina is free from disease. If the vagina is involved, if the disease has extended to the mucous membrane in the neighborhood of the os internum, or if it is confined to the cervix, the radical operation is not justifiable.

In the discussion that followed DR. BARNES agreed substantially with the speaker, and intimated that the statistics of German operators ought not to be too hastily accepted as conclusive. It should not be forgotten that Grigg had reported inoperable cases of cancer in which the patients had survived from two and a half to eight years, although they were let absolutely alone.

The general sense of the Society seemed to be against the frequent performance of vaginal hysterectomy.

THE TECHNIQUE OF ERGOTIN INJECTIONS.

SCHÜCKING (*Centralblatt für Gynäkologie*, February 25, 1888) observes the following precautions in injecting ergotin: The needle must be aseptic, the solution freshly made and undiluted, and the needle is introduced to the depth of a quarter of an inch into the anterior or posterior lip of the cervix uteri. It is claimed that this injection is painless, free from danger, and more prompt and efficient in its action than any other. The rich lymphatic supply of the uterus favors the rapid absorption of the drug. Schücking has never observed any ill effects either local or general following this operation, and in the reported cases in which such ill effects, were noted he believes that in every instance the ergotin was injected, not into the portio vaginalis, but into the body of the uterus or the fibroid itself. The latter method he always avoids. The proper disinfection of the needle is of primary importance. He has also seen good results follow injections of iodine and Fowler's solution in cases of subinvolution of the uterus accompanied with a flabby condition of the organ, and resulting displacement, operative interference (amputation, repair of the cervix) being rendered unnecessary.

AN UNDESCRIBED FORM OF DEGENERATION OF THE OVARY.

GOTTSCHALK (*Centralblatt für Gynäkologie*, No. 31, 1887) reported the following case at a meeting of the Berlin Obstetrical Society. A lady, twenty-eight years of age, had been married ten years, but had never borne children. During the past four years she had had profuse menorrhagia, for which she had been vigorously treated, the uterine cavity having been curetted no less than seventeen times (!) without benefit. Landau finally performed vaginal hysterectomy, removing at the same time both ovaries, which were enlarged to two or three times their usual size. Six months later the patient was perfectly well. A gross examination of the specimens showed nothing abnormal about the uterine mucosa; the wall of the organ was somewhat thickened. Both ovaries were filled with small sanguineous cysts, which, at first sight, seemed to have arisen by hemorrhage into dilated Graafian vesicles; on microscopical examination, however, it was found that the collections of blood were contained within irregular cavities, without proper walls.

Gottschalk called the condition "cavernous transformation of the ovary," and explained it by supposing that there was a new formation of connective tissue along the vessels, which subsequently contracts and causes dilatation of the latter. Sections made through the endometrium and submucosa showed intense hyperæmia of this region, accompanied by general vascular dilatation and minute extravasations.

It was noted at the time of the operation that the uterine arteries were unusually large. There seemed to be a direct connection between the condition of the ovaries and the uterine hemorrhage, and the uselessness of curetting was shown by the condition of the endometrium. As the hyperæmic state of the latter was consequent upon the free anastomosis of the ovarian and uterine arteries, Gottschalk suggested that a cure might have been obtained by opening the abdomen and ligating on both sides the anastomoses between the arteries at a point near the ovarian ligament, without removing the ovaries.

[It seems hardly necessary to resort to such an elaborate explanation of the occurrence of the irregular blood-cysts found within the ovaries, since the description fits exactly that of the interstitial hemorrhages so common in soft fibro-myomata and commencing fibro-cysts, but rather rare in the ovarian stroma. The fact that there was no regular wall or epithelial layer in the cavities, seems to be against the theory of their origin from dilated vessels. The congested condition of the uterus, and the appearance of the pelvic vessels, suggest that the hyperæmia and interstitial hemorrhages in the uterus represented simply a concomitant, and not a causal relation. Whatever the cause of the pelvic congestion may have been, it was doubtless dependent upon one less localized than the degeneration of the ovaries, it was one of those peculiar cases (of which we have seen three or four) in which the cause of the menorrhagia remains unknown, and no change is observed after removal of the ovaries.—ED.]

GALVANISM IN THE TREATMENT OF SUBACUTE PELVIC INFLAMMATION.

APOSTOLI (*Nouvelles Archives d'Obstétrique et de Gynécologie* for February, 1888), after describing a case of hydrosalpinx which he treated successfully by means of the constant current, lays down the following rules:

1. Fever and inflammatory conditions are no positive contraindications to the methodical use of the constant current in gynecology.

2. Non-suppurative inflammation of the uterine appendages may be treated beneficially by galvanism; suppuration is a contraindication.

3. Galvano-puncture aborts phlegmon and arrests inflammatory processes in their inception; the separation of the resulting eschar allows a convenient channel for vaginal drainage.

4. Every case in which a periuterine exudate projects into the vaginal cul-de-sac is a proper one for the application of galvano-caustic puncture.

5. Salpingitis and hydrosalpinx may be safely and easily treated in this way, provided that the tumor lies in close proximity to the fornix.

In every case the operator should observe proper precautions as to the seat of puncture, its depth, and the size of the trocar; strict antisepsis must be observed, and the patient kept in bed after each *séance*.

Amenorrhœa in Diabetes.

Cohn (*Zeitschrift für Geb. u. Gyn.*, Bd. xiv. Heft i.) reports four cases, of which the following are brief notes:

Case I. An unmarried woman, æt. twenty-one, first menstruated at fifteen; the flow was regular for two years and then ceased. She had suffered with diabetes for three years. When examined the uterus was found to be atrophied, while the ovaries could not be felt.

Case II. Married woman, æt. thirty-six. Had borne five children. Menstruation irregular and very scanty during the past two years and a half. Urine contained sugar.

Case III. Æt. forty-two, the mother of five children; amenorrhœa for several months. Uterus atrophied. Urine contained sugar. [Why not the menopause?—Ed.]

Case IV. Æt. thirty-six, two children. For several months entire absence of menses. Uterus atrophied. Diabetes insipidus.

The amenorrhœa was attributed to failure of nutrition, as in phthisical patients.

Strophanthus in the Treatment of Metrorrhagia at the Menopause, and in Plethoric Females.

Poulet (*Gazette de Gynécologie*, February 15, 1888) recommends the drug highly in this class of cases. He rejects strophanthin and the tincture as uncertain, prescribing a pill containing five centigrammes (five-sixths of a grain) of the freshly powdered seeds, two to be taken on the first day, three on the second, and four on the succeeding days, if necessary. Two cases are reported in which hemorrhage at the climacteric was promptly checked by two doses of the pills.

The writer calls attention to the fact that in this class of patients, in spite of the considerable loss of blood, the arterial tension is not lowered, since irritation of the vasoconstrictors is peculiar to the menopause. Ergot, digitalis, belladonna, and other drugs, which increase arterial tension, are, therefore, of little value as hæmostatics; the reverse condition exists in the puerperal state. Strophanthus is especially useful, because it has no vasoconstrictor action, but diminishes tension by regulating the general circulation; it is especially adapted to subjects at the period of the menopause, because arterio-sclerosis is common at this time of life.

Hemorrhages in stout, plethoric women, during the age of fecundity, are essentially of the nature of transudations, the blood being watery and deficient in red disks, while there exists a general want of tone in the muscular system, which is favorable to diapedesis. Metrorrhagiæ in such patients are often very obstinate. Tonics and astringents are uncertain in their action. Strophanthus not only causes diuresis, thus remedying the "aqueous plethora," but at the same time acts directly upon the smooth muscle-fibres of the uterus, promoting contraction, and thus preventing diapedesis. Reference is made to several cases of rapid recovery after the exhibition of this remedy.

The Treatment of Hysteria and Neurasthenia.

Burkart (*Berliner klin. Wochenschrift*, 1887, Nos. 45–47) reports the results of the Weir Mitchell treatment as applied to forty-three carefully selected cases. He insists on the need of discrimination in the selection of patients, since only a certain class are likely to be benefited, while the others will only be made worse. Among the forty-three patients thirty-six were women, all of whom were hysterical. He divides the cases into ten groups, viz.:

1. Visceral neuroses, especially ovarian and uterine neuralgia. Five patients were treated, three being cured. It is interesting to note, he observes, that in this class of cases castration gives only temporary relief; he had under treatment four patients whose ovaries had been removed without permanent benefit.

2. Dyspepsia of hysterical origin; two patients were treated, both being cured.

3. Dyspepsia due to neurasthenia; three were treated, two being cured.

4. Hysterical spine, associated with paralyses; four were cured out of six.

5. Cerebro-spinal hypochondriasis, due to neurasthenia; three out of four were cured.

6. Pure hysteria, with psychical delusions; three patients were treated without benefit.

7. Hysterical convulsions; five out of seven were cured.

8. Migraine and neuralgia were cured in seven out of eight cases.

9. Anæmia and amenorrhœa, associated with hysteria; four patients were treated, with entire success.

10. Hysteria resulting from previous illness; one patient was treated with benefit.

In conclusion, the writer admits that the permanency of the cure is always doubtful; it can only be positively affirmed when the influences which originally led to the development of the affection have been entirely removed.

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